JVC

SERVICE MANUAL

EDITING CONTROL UNIT

RM-G860E/SA-K66U (RACK MOUNT KIT)

SPECIFICATIONS

Power	:	AC 102-240V, 50/60 Hz
Power consumption	:	24W
Weight	:	4.8 kg
Dimensions	:	430(W) x 99(H) x 311(D) mm
Operating temperature	:	0°C to 40°C
Storage temperature	:	-20°C to 60°C
VTR control functions	:	PLAY, REC, FF, REW, STOP, PAUSE/STILL, SHUTTLE SEARCH, JOG, EJECT
Editing control functions		
Edit modes	:	Assemble and Insert
Editing reference	:	EBU time code or CTL pulse
Editing accuracy	:	Timecode-referenced in capstan bump mode: ±0 frame (depending on VTR) CTL-referenced in capstan bump mode: ±2 frames (depending on VTR)
Memory capacity	:	1 event
Preroll time	:	5, 7, 10 sec
VTR interface	:	9-pin serial, 45-pin parallel
Number of VTRs controllable	:	2 players and 1 recorder
Number of VTRs connectable	:	4 players and 2 recorders

Applicable VTRs	: As players		
	KR-M840E/KR-M820E/ KR-M800E/KR-M545E/ KR-M540E/PR-900E/ PR-600E	}	Direct
	BR-S811E/BR-S611E/ BR-S810E/BR-S610E	}	Direct or via SA-F911E
	: As recorders:		
	KR-M840E/KR-M820E/ KR-M800E/PR-900E	}	Direct
	BR-S811E/BR-S810E	}	Direct or via SA-F911E
SYNC IN	: 0.2 to 5.0 Vp-p, negative sync, 75-ohms, unbalanced		
GPI	: Open-collector output		
Counter display			
Time counter	: up to 23 hours, 59 minutes, 59 seconds, 24 frames (TC mode) from -9 hours to 9 hours, 59 minutes, 59 seconds, 24 frames (CTL mode)		
Display	: Total/lap time, IN/OUT points, Servo, Duration, Split edit-point, AT speed, GPI output point, Errors, 9-pin users bits, counter memory		
Display elements	: LED		

* Design and specifications subject to change without notice.

No. 9231
September 1991

COPYRIGHT © 1991 VICTOR COMPANY OF JAPAN, LTD.

TABLE OF CONTENTS

Section	Title	Page
	Important Safety Precautions	
	Instructions	
1.	**GENERAL DESCRIPTION AND DISASSEMBLY**	
1.1	REMOVAL OF EXTERNAL COVERS	1- 1
1.2	REMOVAL OF MAIN BOARDS	1- 1
1.3	REMOVAL OF SWITCHING REGULATOR ASSEMBLY	1- 2
1.4	REMOVAL OF SEARCH/JOG CONTROL ASSEMBLY	1- 2
1.5	COMBINATION FOR SYSTEMATIZATION	1- 3
1.5.1	Note of combination	1- 3
1.5.2	Time code editing with the 11/10 series VTRs	1- 3
1.5.3	Connection with KM-3000E/ KM-D600E	1- 3
1.6	DIP SWITCHES	1- 6
1.7	HOW TO CHECK THE P-ROM (IC49) VERSION AND LED DISPLAY	1- 9
2.	**DIAGRAMS AND CIRCUIT BOARD**	
2.1	MAIN CPU SCHEMATIC DIAGRAM	2- 1
2.2	MAIN CPU CIRCUIT BOARD	2- 3
2.3	OPERATION SCHEMATIC DIAGRAM	2- 4
2.4	OPERATION CIRCUIT BOARD	2- 5
2.5	DISPLAY SCHEMATIC DIAGRAM	2- 6
2.6	DISPLAY CIRCUIT BOARD	2- 7
2.7	CONNECTOR SCHEMATIC DIAGRAM	2- 8
2.8	CONNECTOR CIRCUIT BOARD	2- 9
2.9	JOG SCHEMATIC DIAGRAM	2-10
2.10	JOG CIRCUIT BOARD	2-10
2.11	SWITCHING REGULATOR ASS'Y SCHEMATIC DIAGRAM	2-11
2.12	OVERALL WIRING DIAGRAM	2-12
2.13	IC BLOCK DIAGRAMS	2-13
3.	**EXPLODED VIEWS AND PARTS LIST**	
3.1	STANDARD PART NUMBER CODING	3- 1
3.1.1	Screw coding	3- 1
3.2	EXPLODED VIEWS AND PARTS LIST	3- 2
3.2.1	Packing assembly <M1>	3- 2
3.2.2	Chassis assembly <M2>	3- 5
3.2.3	Search/jog control assembly <M3>	3- 6
4.	**ELECTRICAL PARTS LIST**	
4.1	STANDARD PART NUMBER CODING	4- 2
4.1.1	Fixed resistor coding	4- 2
4.1.2	Fixed capacitor coding	4- 3
4.1.3	Fuse coding	4- 5
	MAIN CPU BOARD ASSEMBLY <01>	4- 6
	OPERATION BOARD ASSEMBLY <02>	4- 8
	DISPLAY BOARD ASSEMBLY <03>	4- 9
	CONNECTOR BOARD ASSEMBLY <04>	4-10
	JOG BOARD ASSEMBLY <24>	4-10
	SA-K66U (RACK MOUNT KIT)	
1.	**MOUNTING the SA-K66U**	1
2.	**PACKING ASSEMBLY**	2

Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▒▒) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors
   5) Barrier

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

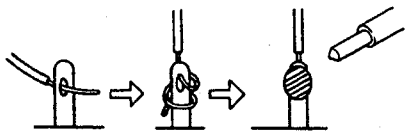


Fig. 1

7. Observe that wires do not contact heat producing parts (heat-sinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10—15 kg of force in any direction will not loosen it.

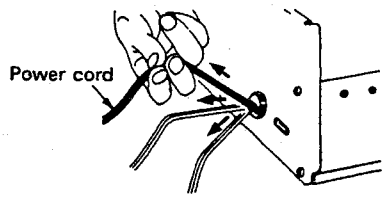


Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

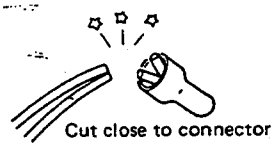


Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

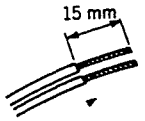


Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

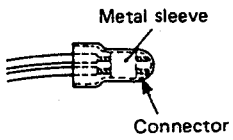


Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

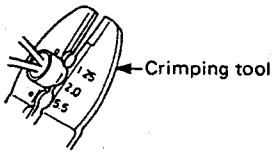


Fig. 6

(5) Check the four points noted in Fig. 7.

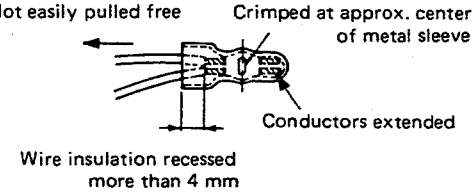


Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. Insulation resistance test

Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

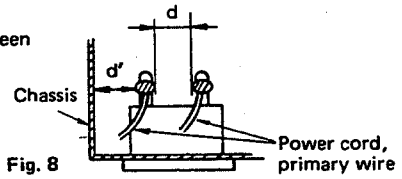


Fig. 8

4. Leakage current test.

Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method: (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

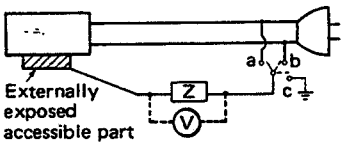


Fig. 9

5. Grounding (Class I model only)

Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).

Measuring Method:

Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

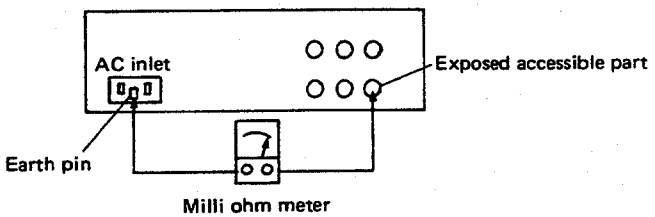


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R≧1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 minute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	–	AC 900 V 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R≧10 MΩ /500 V DC	AC 3 kV 1 minute (Class II) AC 1.5 kV 1 minute (Class I)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF, 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current specifications for each region

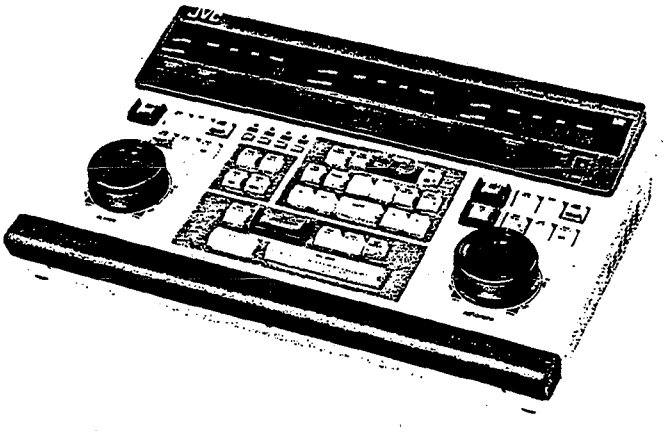
Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

INSTRUCTIONS

JVC

RM-G860E

EDITING CONTROL UNIT



PGD30002-225

Warning Notice
FOR YOUR SAFETY (Australia)

1. Insert this plug only into effectively earthed three-pin power outlet.
2. If any doubt exists regarding the earthing, consult a qualified electrician.
3. Extension cord, if used, must be three-core correctly wired.

IMPORTANT (In the United Kingdom)
Mains Supply (AC 240 V~)
WARNING — THIS APPARATUS MUST BE EARTHED

The wires in this mains lead are coloured in accordance with the following code;

GREEN-and-YELLOW:	EARTH
BLUE:	NEUTRAL
BROWN:	LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows. The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the safety earth symbol ⏚ or coloured GREEN or GREEN-AND-YELLOW. The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or which is coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

POWER SYSTEM
This unit operates on voltage of 102 to 240 V AC with automatic switching.

This unit is produced to comply with Directives 76/889/EEC, 82/499/EEC and 87/308/EEC.

WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

CAUTION
To prevent electric shock, do not open the cabinet. No user serviceable parts inside. Refer servicing to qualified service personnel.

Note: The rating plate and the safety caution are on the rear of the unit.

CONTENTS

Features 3
Controls and connectors 5
- Front panel
- Control panel section
- System setting panel section
- Rear panel

Connections 13
GPI ports 15
Preparation 17
- Preparing VTRs
- Preparing the RM-G860E
- Preparing recording tapes
- Preparing system equipment (for A/B roll editing)
- Setting the special effects generator (for A/B roll editing)

Remote control of players and recorder 19
- Selection of the VTR to be controlled
- Tape transport control
- Search control

Basic editing (cut editing) 21
- Operating flowchart
- Selecting the type of editing
- Entry of edit points
- Preview editing
- Cancellation and correction of edit points
- Execution of an edit
- Review

A/B roll editing 27
- Operating flowchart
- Selecting the type of editing and player sequence
- Entry of edit points
- Preview editing
- Cancellation and correction of edit points
- Execution of an edit
- Review

Audio split editing 33
AT (Auto Tracking) editing 34
Run editing 35
Independent editing 36
Timecode-referenced editing 36
- Setting to the time code mode
- To read user bits

Time counter memory function 37
GPI pulse output timing and manual take 38
REC EE function 39
Simultaneous control of two players 39
Information on the counter display 39
- Error messages
- Other indications

Connector Specifications 41
Specifications 42

FEATURES

Control over three VTRs
The RM-G860E is capable of remote-controlling two players and one recorder. All operations, including selection of the unit to be controlled, can be performed with the RM-G860E's control panel.

Serial and parallel remote control interfaces
The built-in serial and parallel remote control interfaces make it possible to control the players and recorder via either 9-pin or 45-pin connectors. Even a system that includes both types of VTRs can be controlled with the VTRs retaining all capabilities including jog and shuttle search functions.

CTL- or timecode-referenced editing selectable
With 9-pin VTRs connected, either CTL or timecode counts can be selected for display on the time counters.

Colour frame editing
In 9-pin timecode-referenced editing, the RM-G860E performs colour frame editing based on colour frame information included in the 9-pin RS-422 signals. In 45-pin editing (including 9-pin editing via the SA-F911E Interface Unit), colour framing is controlled by the colour frame servos of the connected VTRs.

Auto colour frame shift and colour frame indication
In 9-pin timecode-referenced editing, the player's edit-in point is automatically shifted so that its colour frame matches that at the recorder's edit-in point. The degree of colour frame shift can also be indicated for manual correction.

Control over external equipment
The RM-G860E incorporates ports for controlling a video switcher and an audio mixer. GPI timing pulses are delivered to these external units to operate them in sync with VTRs.

Two search/jog dials
Two search/jog dials permit quick tape access on both player and recorder without having to switch dial function.

Three time counters
Separate time counters corresponding to each of the three VTRs permit quick location of edit points on each unit. These time counters display various kinds of data, including counter readings, edit points, total time, and lap time.

Simplified Auto Tracking editing
AT (Auto Tracking) playback is possible when VTRs equipped with Auto Tracking (AT) heads are used and controlled via the 9-pin connectors. Tape speed can be varied within the range permitted by the AT VTR. The RM-G860E registers the adjusted AT playback speed and controls the VTR at this exact speed in actual editing.

Audio-split editing
Audio edit-in points can be specified independently of video edit-in points. Entry points are determined in frames relative to the video edit-in points.

Time counter memory
In addition to edit-in and edit-out points, up to four counter readings can be temporarily held in memory. The stored counter data can be checked at any time by pressing the corresponding DA button, located by pressing the GOTO button, or transferred as edit-in or edit-out points.

Trimming function with recorder's jog dial
Edit duration, edit-in and edit-out points, audio edit-in point, and GPI pulse timing from the video switcher and audio mixer ports can all be set directly with the jog dial for the recorder.

Capstan bump function
The capstan bump function keeps the three VTRs in phase, ensuring high editing accuracy.

Preview, review and go-to functions
Preview, review and go-to functions are provided. The go-to function permits location both of edit points and of memorized counter reading points. Edit-in or edit-out points on all three VTRs can also be located with a single operation. In cut editing, in addition to normal preview, an edit-out preview function is available for confirmation of only the section across the edit-out point.

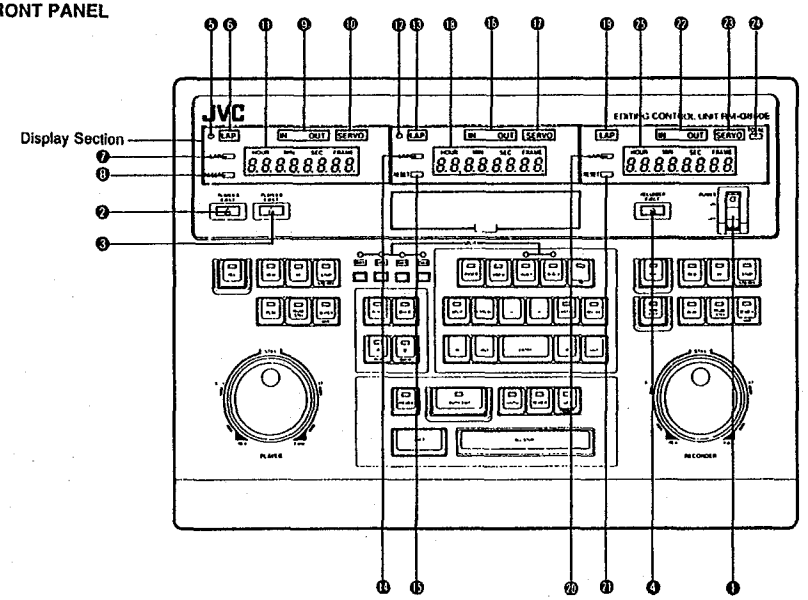
Error messages
Warnings are available as error messages on the time counter display.

Last-edit display
Edit-point data for the previous edit can be displayed on the time counters.

Rack mounting
The RM-G860E can be installed in a standard 19" rack using the optional SA-K66U Rack Mount Adapter Kit.

CONTROLS AND CONNECTORS

FRONT PANEL



❶ **POWER switch**
Turns the power of the RM-G860E ON and OFF. Before turning the power ON, make sure all external equipment has been connected.

❷ **PLAYER-A EJECT button**

❸ **PLAYER-B EJECT button**
Press to eject the video cassettes from the VTRs connected to the PLAYER connectors on the rear panel (9-pin or 45-pin).

❹ **RECORDER EJECT button**
Press to eject the video cassette from the VTR connected to the RECORDER connector on the rear panel.

Display Section

❺ **Player A indicator**
Lights when player A is selected with the A/B buttons on the Editing Control Section.

❻ **LAP indicator for player A**
Lights when the Lap mode is selected with the LAP button ❼.

❼ **LAP button for player A**
With this button ON, the elapsed time is displayed from the edit-in point of either the current edit (if already entered) or the previous edit. The LAP indicator lights while the elapsed time is being displayed.

❽ **RESET button for player A**
When the time counter is in the CTL mode, counter data, lap time and entered edit data can all be cancelled by pressing this button. In the TC mode, lap time and entered edit data can be cancelled.

❾ **IN/OUT indicators for player A**
"IN" lights or blinks when edit-in point data is displayed and "OUT" lights or blinks when edit-out point data is displayed.

❿ **SERVO lock indicator for player A**
Lights when the VTR's drum servo and capstan servo systems are locked.

⓫ **Counter display for player A**
Indicates tape position and edit data, etc. in hours, minutes, seconds and frames for the VTR connected to the PLAYER A connector on the rear panel (9-pin or 45-pin). Also displays error messages.

⓬ **Player B indicator**
Lights when player B is selected with the A/B buttons on the Editing Control Section.

⓭ **LAP indicator for player B**
Lights when the Lap mode is selected with the LAP button ⓮.

⓮ **LAP button for player B**
With this button ON, the elapsed time is displayed from the edit-in point of either the current edit (if already entered) or the previous edit. The LAP indicator lights while the elapsed time is being displayed.

⓯ **RESET button for player B**
When the time counter is in the CTL mode, counter data, lap time and entered edit data can all be cancelled by pressing this button. In the TC mode, lap time and entered edit data can be cancelled.

⓰ **IN/OUT indicators for player B**
"IN" lights or blinks when edit-in point data is displayed and "OUT" lights or blinks when edit-out point data is displayed.

⓱ **SERVO lock indicator for player B**
Lights when the VTR's drum servo and capstan servo systems are locked.

⓲ **Counter display for player B**
Indicates tape position and edit data, etc. in hours, minutes, seconds and frames for the VTR connected to the PLAYER B connector on the rear panel (9-pin or 45-pin). Also displays error messages.

⓳ **LAP indicator for recorder**
Lights when the Lap mode is selected with the LAP button ⓴.

⓴ **LAP button for recorder**
With this button ON, the elapsed time is displayed from the edit-in point of either the current edit (if already entered) or the previous edit. The LAP indicator lights while the elapsed time is being displayed.

㉑ **RESET button for recorder**
When the time counter is in the CTL mode, counter data, lap time and entered edit data can all be cancelled by pressing this button. In the TC mode, lap time and entered edit data can be cancelled.

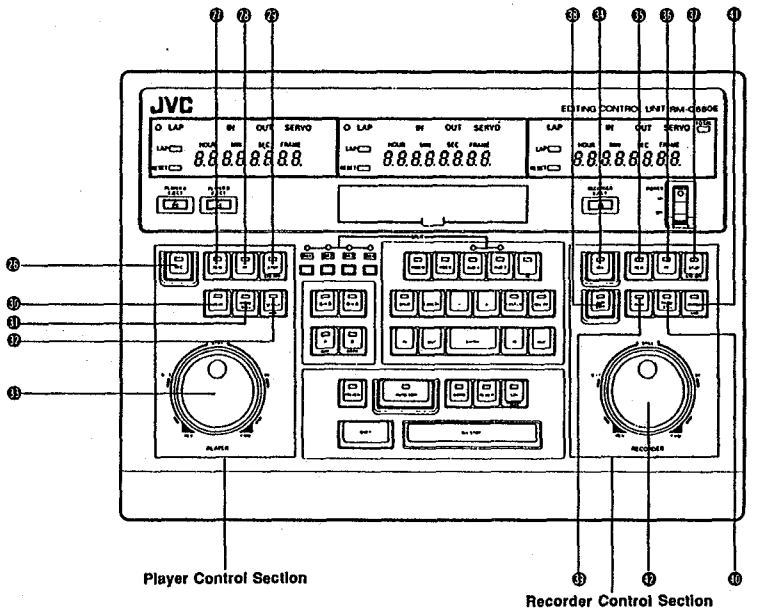
㉒ **IN/OUT indicators for recorder**
"IN" lights or blinks when edit-in point data is displayed and "OUT" lights or blinks when edit-out point data is displayed.

㉓ **SERVO lock indicator for recorder**
Lights when the VTR's drum servo and capstan servo systems are locked.

㉔ **TOTAL button**
When this button is pressed, the total time of executed edits from the initial time is displayed on the recorder's counter display. When the TOTAL button and the IN button for the recorder are pressed simultaneously, the initial time is indicated. When the TOTAL and GOTO buttons are pressed simultaneously, the tape position corresponding to the initial time is accessed. Also, when the RESET button for the recorder and the TOTAL button are pressed simultaneously, the total time is reset. If no edit-in point is entered and the total time is not reset after setting the POWER switch to ON, the initial time will be the point where the TOTAL button is first pressed. If an edit-in point is entered before pressing the TOTAL button, the initial time will correspond to the edit-in point.

㉕ **Counter display for recorder**
Indicates tape position and edit data, etc. in hours, minutes, seconds and frames for the VTR connected to the RECORDER connector on the rear panel (9-pin or 45-pin). Also displays error messages.

CONTROL PANEL SECTION



When these buttons are pressed, the functions indicated on the buttons are activated and their indicators light. To activate the function indicated on the front of a button, press the button while pressing the SHIFT button.

Example: STOP/STB OFF button

- Function on the button ..... STOP button
  When pressed on its own, the Stop mode* is engaged and the indicators in the STOP and PAUSE/STILL buttons light.
- Function on the front of the button ..... STB OFF button
  When pressed together with the SHIFT button, the Standby-Off mode is engaged and the indicator in the STOP button lights.

* "Stop mode" in this manual refers to the Standby On mode, a status in which the tape stops but remains in the loaded position.

Player Control Section

⑱ REC button
Press together with the PLAY button ⑲ to start recording. When the REC button is pressed on its own during playback, the input signal can be monitored.

⑰ REW button
Press in the Stop mode to rewind the tape. When this button is pressed during playback, the high-speed search mode will be engaged.

⑯ FF button
Press in the Stop mode to fast forward the tape. When this button is pressed during playback, the high-speed search mode will be engaged.

⑮ STOP button
STOP: Press to stop the tape and enter the Stop mode (Standby On mode). The STOP and PAUSE/STILL indicators light. When controlled through a 45-pin connector, the VTR enters the Still mode.
STB OFF (SHIFT + STOP) (PAUSE/STILL + STOP): Press together with the SHIFT or PAUSE/STILL button to enter the Standby Off mode. In the Standby Off mode, the indicator in the STOP button will light. When controlled through a 45-pin connector, the VTR enters the Stop mode.

⑭ PLAY button
Press to start playback, or together with the REC button to start recording.

⑬ PAUSE/STILL button
Press to stop the tape temporarily during recording or playback. To release the Record-Pause or Still mode, press the PLAY button.

⑫ SEARCH/VAR button
SEARCH: Press to set to ON for search operations using the SEARCH/JOG dial. The tape plays back at the speed set by the SEARCH dial as soon as the SEARCH button is pressed.
VARIABLE (SHIFT+SEARCH): Press together with the SHIFT button to enter the Variable speed mode. Using the SEARCH dial, playback speed can be varied between –1 and +2 times normal speed.
See page 20.

⑪ SEARCH/JOG dial
This dial consists of two concentric controls; the outer control functions as a shuttle search dial and the inner control functions as a jog dial. Both are used to search for the desired playback picture.

Recorder Control Section

⑩ REC button
Press together with the PLAY button ⑪ to start recording. When the REC button is pressed on its own during playback, the input signal can be monitored.

⑨ REW button
Press in the Stop mode to rewind the tape. When this button is pressed during playback, the high-speed search mode will be engaged.

⑧ FF button
Press in the Stop mode to fast forward the tape. When this button is pressed during playback, the high-speed search mode will be engaged.

⑦ STOP button
STOP: Press to stop the tape and enter the Stop mode (Standby On mode). The STOP and PAUSE/STILL indicators light. When controlled through a 45-pin connector, the VTR enters the Still mode.
STB OFF (SHIFT + STOP) (PAUSE/STILL + STOP): Press together with the SHIFT or PAUSE/STILL button to enter the Standby Off mode. In the Standby Off mode, the indicator in the STOP button will light. When controlled through a 45-pin connector, the VTR enters the Stop mode.

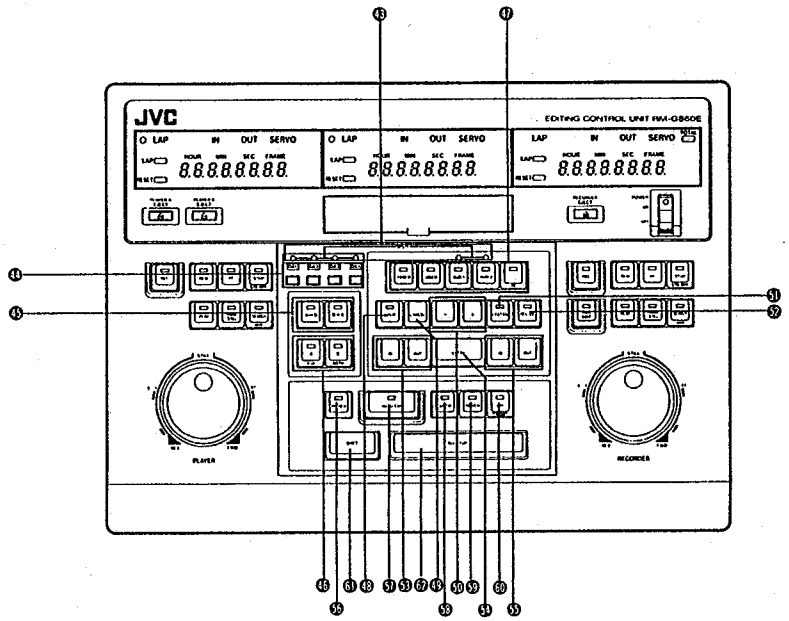
⑥ RUN EDIT button
Press while in the Play mode together with the PLAY button to start manual editing.

⑤ PLAY button
Press to start playback, or together with the REC button to start recording.

④ PAUSE/STILL button
Press to stop the tape temporarily during recording or playback. To release the Record-Pause or Still mode, press the PLAY button.

③ SEARCH/VAR button
SEARCH: Press to set to ON for search operations using the SEARCH/JOG dial. The tape plays back at the speed set by the SEARCH dial as soon as the SEARCH button is pressed.
VARIABLE (SHIFT+SEARCH): Press together with the SHIFT button to enter the Variable speed mode. Using the SEARCH dial, playback speed can be varied between –1 and +2 times normal speed.

② SEARCH/JOG dial
This dial is constructed as two concentric controls; the outer control functions as a shuttle search dial and the inner one functions as a jog dial. Both are used to search for the desired playback picture.
The JOG dial is also used to correct edit points, set audio edit-in points in audio-split editing, or to set GPI advance timing.



Editing Control Section

⑱ SPLIT indicators
The corresponding indicator lights when an audio edit-in point is entered in audio-split editing. See page 33.

⑰ DA buttons (DA1 to DA4)
Press to temporarily store time counter readings in memory. The stored time counter readings can be called up and used as edit points. Effective only for the players. See page 37.
Be careful; if DIP switch SW2-1 is set ON, time counter readings are not stored in memory.

⑯ A/B roll select buttons
To specify the order of playback between two playback VTRs in A/B roll editing.
A → B: Player A starts playback first, followed by player B.
B → A: Player B starts playback first, followed by player A.
If the order of playback is not selected, editing can be done between the player selected with the A/B select buttons ⑯ and the recorder.

⑮ Player A/B select buttons
To select the player to be controlled via the player control section.
A button (A/AUX)
A: To select player A.
AUX (SHIFT+A): (Press together with the SHIFT button ㉑.) The VTR used as the recorder can be used to edit from external sources, independently from the players connected to the RM-G860E.
B button (B/BOTH)
B: To select player B.
BOTH (SHIFT+B): (Press together with the SHIFT button ㉑.) Used to control players A and B simultaneously.

⑭ Edit mode select buttons
To select either the Assemble or Insert Edit mode and the signal(s) to be inserted (video, audio-1, audio-2, time code). Set these buttons before starting preview editing or actual editing.
ASSEM: To assemble-edit the video, audio-1, audio-2, and time code (if available) signals.
AUD-1: To insert-edit the audio-1 signal.
AUD-2: To insert-edit the audio-2 signal.
VIDEO: To insert-edit the video signal.
These three insert buttons can be used in any combination by pressing them ON. The LEDs above the AUD-1 and AUD-2 buttons light when the corresponding signal is assigned for split-editing.
(TC): The user bits are displayed on the time counter while this button is being depressed. When pressed together with the SHIFT button ㉑, the time code will be inserted.

⑬ Audio signal SPLIT button
To set the edit-in point of the audio signal independently of the edit-in point of the video signal. The audio edit-in point can be specified in frames relative to the video edit-in point by turning the JOG dial for the recorder while the SPLIT button is depressed. Edit-point data is entered by pressing the SPLIT button together with the ENTRY button ㉔.

⑫ CANCEL button
To clear entered data from memory (edit points, audio-split edit points, GPI advance timing and counter data). Press the IN/OUT buttons ㉒ ㉓,the SPLIT button⑬, the GPI ADVANCE button ⑩, or DA buttons ⑰ together with the CANCEL button to clear the corresponding memory.

⑳ Minus (–)/Plus (+) buttons
By pressing either button while the IN or OUT button is depressed, an entered edit point can be shifted frame by frame in the corresponding direction. When either button is pressed on its own, the IN or OUT indicators in the three time counters blink and the edit-in or -out points of the three VTRs are displayed. When the CANCEL button is pressed while either button is depressed, the edit-in or -out points of the three VTRs are cleared from memory simultaneously. Also, when the ENTRY button is pressed while either button is depressed, the readings of the three time counters are entered simultaneously as edit-in or -out points. When the GOTO button is pressed while either button is depressed, the edit-in or -out points of all the VTRs are accessed. When the Minus (–) and Plus (+) buttons are pressed simultaneously, the IN and OUT indicators in the three time counters blink, and the durations between the edit-in and edit-out points are displayed.

㉑ LAST ED button
Press to recall the edit point data of the previous edit.
When this button is pressed, the edit point data of the edit executed last is displayed on the time counter. When pressed again, the edit point data of the current edit is displayed.
- This unit incorporates one memory to store the edit point data of an edit. Pressing the LAST ED button alternates the data in memory between the executed edit and the current edit. When an edit is executed, its data is automatically stored in memory.
- The LAST ED button lets you use a single-event memory like a dual-event memory.

⑫ REC EE button
Press to monitor the recorder's input signal on a TV monitor connected to the recorder. See page 39.

㉓ IN/OUT buttons for players
When either button is pressed on its own, the corresponding IN or OUT indicator blinks and the edit-in or -out point is indicated on the time counter. When either button and the ENTRY button are pressed simultaneously, an edit-in or -out point is entered; when pressed together with the CANCEL button, the edit-in or -out point is cleared. Press the Minus (–) or Plus (+) button together with the IN or OUT button to shift the entered edit-in or -out point frame by frame in the corresponding direction.
When the IN and OUT buttons are pressed simultaneously, the IN and OUT indicators in the corresponding time counter blink, and the duration of the edit is displayed. If the GOTO button is pressed with the IN or OUT button depressed, the edit-in or -out point of the corresponding VTR is accessed.

㉔ ENTRY button
To store edit points and time counter data in memory. When this button is pressed together with the IN or OUT button, an edit-in or edit-out point is entered. After selecting the player using the A or B select button, press the ENTRY button together with one of the DA buttons to store the current time counter data in memory.

㉒ IN/OUT buttons for recorder
See ㉓. In addition, the IN/OUT buttons for the recorder can also be used with the JOG dial for the recorder, to shift edit points, or to modify the duration of the edit. Turn the JOG dial while pressing either the IN or OUT button, or while pressing both the IN and OUT buttons, respectively.

⑲ PREVIEW button
To start rehearsal editing. If this button is pressed again during rehearsal editing, rehearsal editing will start again from the beginning.

⑨ AUTO EDIT button
After the edit points have been determined, press this button to start actual editing. If this button is pressed during preview editing, actual editing will start. If pressed again during actual editing, editing will start again from the beginning.

⑱ GOTO button
Press together with the appropriate button(s) to access specified tape positions.

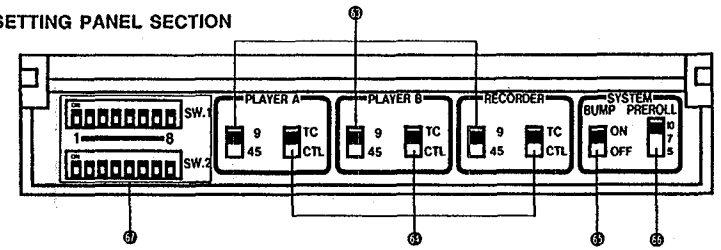
⑲ REVIEW button
To review the executed edit.

⑩ GPI ADVANCE button
To set the GPI pulse output timing independently of the edit-in point. By turning the JOG dial for the recorder while pressing this button, the GPI pulse output time can be set in frames relative to the edit-in point. When this button is pressed together with the SHIFT button, a "manual take" pulse is output from the GPI port. During A/B roll editing, if this button is pressed together with the SHIFT button before the preset pulse output time has been reached, the pulse will be output immediately and not be at the preset time.

㉑ SHIFT button
Pressing this button together with an operation button activates the function indicated on the front of the button.

⑨ ALL STOP button
Press this button to stop all the VTRs. The VTRs controlled by 9-pin remote control signals will enter the Stop mode and those controlled by 45-pin remote control signals will enter the Still mode.

SYSTEM SETTING PANEL SECTION



⑭ 45/9-pin remote control system select switches
Select the remote control systems depending on the types of VTRs connected.
45: for VTRs with a 45-pin remote control interface
9: for VTRs with a 9-pin remote control interface

⑬ TC/CTL select switches
CTL: Counts and indicates the CTL signals recorded on the tape. The counter display can be reset by pressing the RESET button.
TC: Indicates the time codes read by the 9-pin remote control system. The time code display cannot be reset by pressing the RESET button.

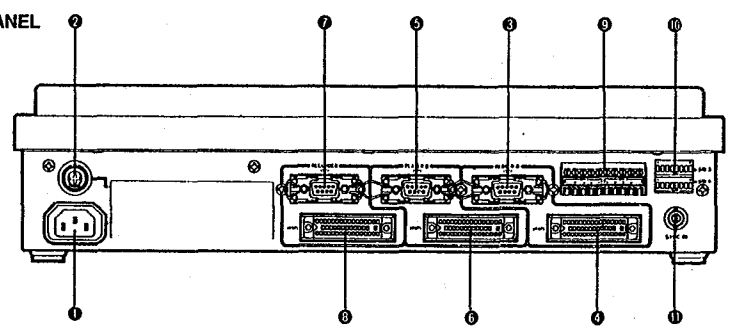
⑮ SYSTEM BUMP ON/OFF switch
ON: Capstan bump function controls tape running for highly accurate editing.
OFF: No capstan bump function.
With the BUMP switch ON, the three VTRs run in phase.

⑯ SYSTEM PREROLL time select switch
Preroll times of 5 seconds, 7 seconds and 10 seconds can be selected. Preroll time of 10 seconds can be changed to 15 seconds by setting DIP switch SW1-5 ⑰ to ON. The capstan bump function does not operate with preroll time of 5 seconds.
NOTE:
- When using the SA-F911E Interface Unit, set the preroll time to 10 seconds or longer.

⑰ System setup DIP switches
To change the factory preset functions of the editing system. Prior to shipment, all switches are set to OFF (down).

No.	Function
SW1-1	Selects the automatic retry mode when in-phase adjustment fails with the BUMP switch ON: whether the retries should be performed with changing preroll times or changing editing accuracy. SW1-1 With changing preroll times OFF When set to 7 sec: 7 → 7 → 7 → 10 → 10 → 10 When set to 10 sec: 10 → 10 → 10 When set to 15 sec: 15 → 15 → 15 With changing editing accuracy ON 4-Field CF mode: 0 frame → ±1 frame → Rough 8-Field CF mode: 0 frame → ±2 frames → Rough
SW1-2	OUT point return function ON/OFF switch in insert editing. SW1-2 OUT point return function ON OFF OUT point return function OFF ON
SW1-3	Auto REC EE function ON/OFF switch (With auto REC EE function ON, the REC EE mode is automatically cancelled when the recorder is operated manually with the REC EE switch set to ON, or the REC EE mode is automatically engaged when either player is operated.) SW1-3 Auto REC EE function OFF OFF Auto REC EE function ON ON
SW1-4	Not used. Keep set to OFF.
SW1-5	Switches the 10-second preroll time to 15 seconds. SW1-5 10 seconds OFF 15 seconds ON
SW1-6 SW1-7 SW1-8	To select edit-in timing in 9-pin editing. It is preset to –3 frames. SW1-6 SW1-7 SW1-8 –1 frame OFF ON OFF –2 frames OFF OFF ON –3 frames OFF OFF OFF –4 frames OFF ON ON –5 frames ON OFF OFF –6 frames ON OFF ON –7 frames ON ON OFF –8 frames ON ON ON
SW2-1	Time counter memory/Special function select switch. SW2-1 Time counter memory OFF Special function ON
SW2-2 SW2-3	To select editing accuracy. Set to "±1 frame" when the 4-field colour framing mode is selected with the KR-M840E connected. SW2-2 SW2-3 0 frame OFF OFF ±1 frame OFF ON ±2 frames ON OFF Rough ON ON
SW2-4	Determines whether or not there will be a beep when a control button is pressed. SW2-4 Beep OFF No beep ON
SW2-5	To select the colour framing mode (effective in 9-pin editing). SW2-5 2-field mode ON 4-field or 8-field mode OFF
SW2-6	To select the same-duration edit function (in which the OUT point is automatically registered as the IN point of a new edit and the OUT point of a new edit is also automatically registered with respect to that IN point so that the duration is the same as that of the previous edit.) SW2-6 Same-duration edit function OFF OFF Same-duration edit function ON ON
SW2-7	To select use of TBC when editing via the SA-F911E. SW2-7 With TBC ON Without TBC OFF
SW2-8	To defeat the auto colour frame shift function in 9-pin timecode-referenced editing SW2-8 Auto colour frame shift ON ON Auto colour frame shift OFF OFF

REAR PANEL



❶ AC IN connector
Connect to a 102 — 240 V AC, 50/60 Hz outlet.
❷ FUSE holder
❸ 9-pin remote connector for player A
❹ 45-pin remote connector for player A
❺ 9-pin remote connector for player B
❻ 45-pin remote connector for player B
❼ 9-pin remote connector for recorder
❽ 45-pin remote connector for recorder
Connect the recorder and players A and B with optional 45-pin cable or 9-pin cables.
❾ GPI-1/GPI-2 connection ports.
Output pulses to start video switcher and audio mixer effects. See page 15.
❿ DIP switches for additional functions
Prior to shipment, all switches are set to OFF (down).

No.	Function
SW3-1	Selects between CTL and FG signals as the recorder's time counting reference. SW3-1 CTL signal OFF (Set to ON when using the FG signal ON the PR-900E.)
SW3-2	Selects between CTL and FG signals as player A's time counting reference. SW3-2 CTL signal OFF (Keep set to OFF.) FG signal ON
SW3-3	Selects between CTL and FG signals as player B's time counting reference. SW3-3 CTL signal OFF (Keep set to OFF.) FG signal ON
SW3-4	Not used. Keep set to OFF.
SW3-5	Set to ON when using the KR-M800E as the recorder.
SW3-6	Set to ON when using the PR-900E as the recorder.
SW3-7	Set to ON when using the KR-M800E/PR-900E/PR-600E as player A.
SW3-8	Set to ON when using the KR-M800E/PR-900E/PR-600E as player B.

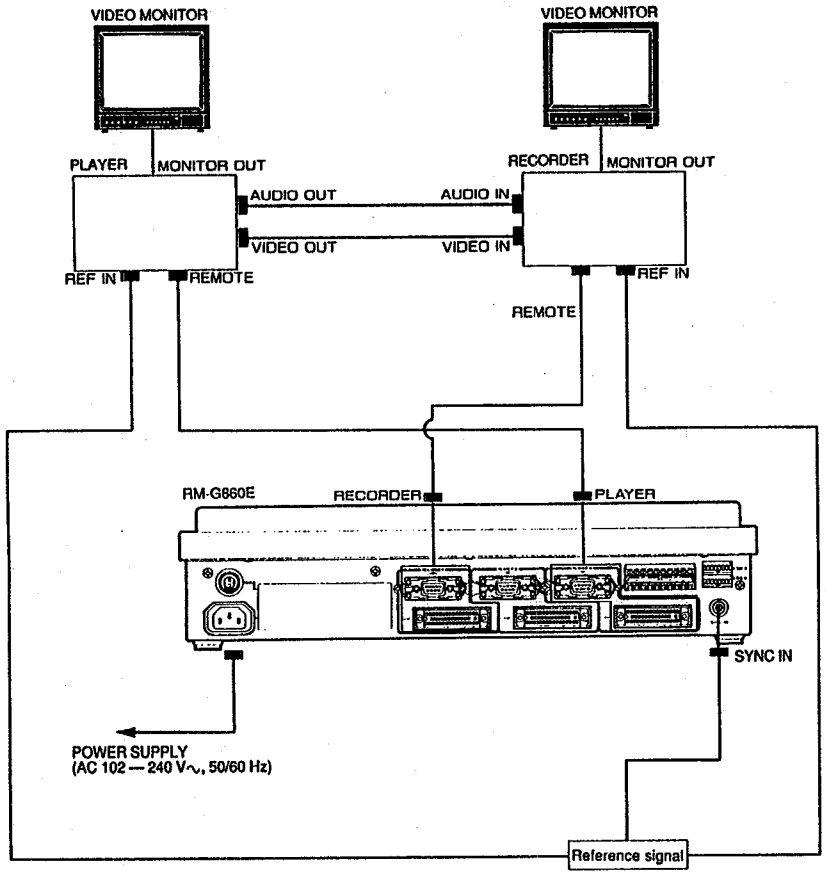
No.	Function
SW4-1	Selects video circuitry according to connected equipment. SW4-1 With KM-D600E, KM-3000E OFF With SA-W700E ON
SW4-2	To select the postroll time (playback time after the edit-out point in preview and review). SW4-2 5 sec OFF 1 sec ON
SW4-3	Selects between 4-field and 8-field colour framing modes when system setting panel DIP switch SW2-5 is set to OFF. SW4-3 4-field mode OFF 8-field mode ON
SW4-4	Selects audio circuitry according to connected equipment. SW4-4 With all equipment except SA-W700E OFF With SA-W700E ON
SW4-5/6/7	To select edit-in timing in 45-pin editing. It is preset to –2 frames. SW4-5 SW4-6 SW4-7 –1 frame ON OFF OFF –2 frames OFF OFF OFF (for BR-S811E/BR-S810E) –3 frames OFF ON OFF (for KR-M800E/KR-M820E/PR-900E) –4 frames ON ON OFF –5 frames OFF OFF ON (for KR-M840E with SA-K22E) –6 frames ON OFF ON –7 frames OFF ON ON –8 frames ON ON ON
SW4-8	Selects the time tracking function. (With the time tracking function ON, if the recorder's IN point automatically registered at the OUT point of the previous edit is shifted, the player's IN point is also shifted accordingly.) SW4-8 Time tracking function OFF OFF Time tracking function ON ON

NOTE:
- SW3-5/6/7/8 must be set to OFF when not using the KR-M800E/PR-900E/PR-600E.

⓫ SYNC IN connector
Accepts a reference signal for synchronization. A composite sync signal or a composite video signal can be input as the reference signal.

CONNECTIONS

1. Basic system (with one recorder and one player)

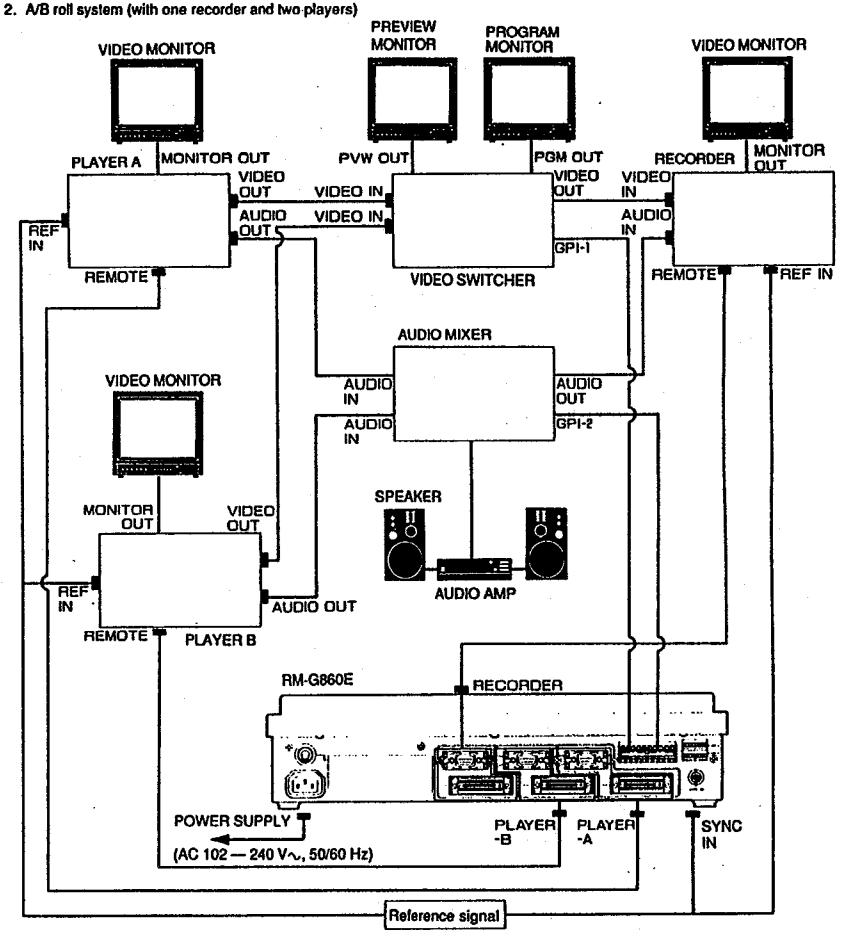


NOTES:

- When using the SA-F911E Interface Unit: set the SA-F911E's DIP switch SW2-8 to ON and SW2-7 to OFF. Set the RM-G860E's edit-in timing to –2 frames. If a TBC is also used, set the RM-G860E's system setting panel DIP switch SW2-7 to ON.
- With S-VHS machines, set the preroll time to 10 seconds or longer. With component machines, set the preroll time to 7 seconds or longer.

- When an external sync signal is not supplied, there may be an error of ±1 frame in terms of editing accuracy.

2. A/B roll system (with one recorder and two players)

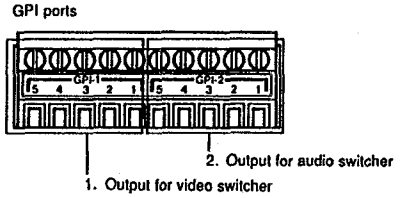


In A/B roll editing with the MI-F30E, the audio signal selected on the PROGRAM bus can be automatically switched to the one selected on the PRESET bus.

- This switching is not linked with selection of the player with the A/B select buttons. Before executing A/B roll editing, select the audio signals on the PROGRAM and PRESET buses manually with the MI-F30E. For more details refer to the instruction manual of the MI-F30E.

- When an external sync signal is not supplied, there may be an error of ±1 frame in terms of editing accuracy.
- When using players with no built-in TBC, connect a TBC.
- Do not attempt to reset the REMOTE/LOCAL switch at intervals shorter than one second.

GPI PORTS



1. Output for video switcher (GPI-1)

Pin No.	Signal
1	Open-collector output — A SELECT … EFECT
2	Open-collector output — B SELECT … EFECT
3	Open-collector output — EFECT
4	Not used
5	GND

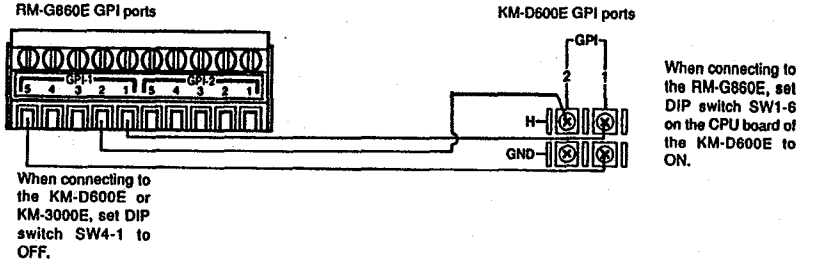
2. Output for audio switcher (GPI-2)

Pin No.	Signal
1	Open-collector output — A SELECT … EFECT
2	Open-collector output — B SELECT … EFECT
3	Open-collector output — EFECT
4	Not used
5	GND

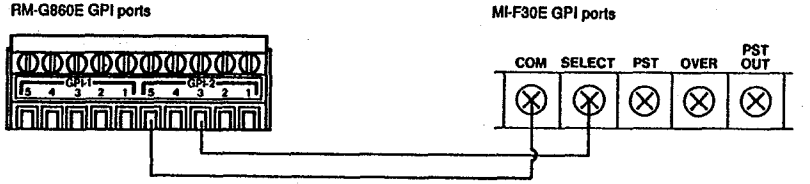
The MI-F30E Audio Fader is the only unit currently usable with GPI-2, and the only possible function is execution of effects.

Connection Example

- Connection to the KM-D600E Y/C Digital Effects Generator



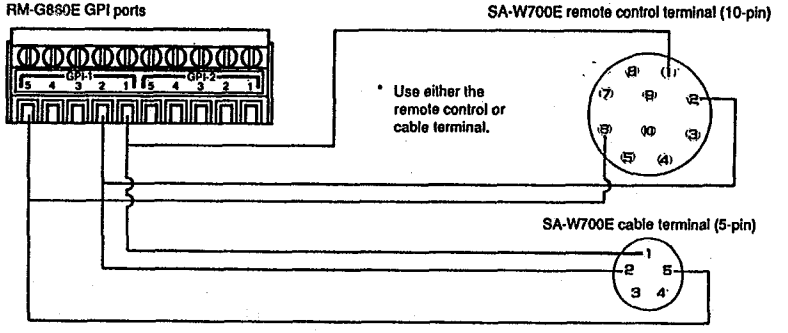
- Connecting to the MI-F30E Audio Fader



In A/B roll editing with the MI-F30E, the audio signal selected on the PROGRAM bus can be automatically switched to the one selected on the PRESET bus.

- This switching is not linked with selection of the player with the A/B select buttons. Before executing A/B roll editing, select the audio signals on the PROGRAM and PRESET buses manually with the MI-F30E. For more details refer to the Instruction manual of the MI-F30E.

- Connecting to the SA-W700E Audio/Video Switcher (Colour frame editing is not possible.)



PREPARATION

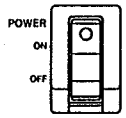
PREPARING VTRs

Prepare VTRs as players and recorder as follows:

1. Set their power switches to ON.
2. Set their REMOTE/LOCAL switches to REMOTE (9-pin/45-pin).
3. Load the required cassette tapes.
4. Perform necessary adjustments to the players. (Tracking, Audio signal playback level, etc. Set the FRAME SERVO switch to FRAME or 2F.)
5. Perform necessary adjustments to the recorder. (Input select switch, Video/Audio signal recording level, etc. Set the FRAME SERVO switch to COLOUR FRAME.)

PREPARING THE RM-G860E

1. Set the POWER switch to ON.



Prepare the RM-G860E system setting panel as follows:

2. Set the 45/9 (45-pin/9-pin) switches according to the VTRs connected.

3. Set the TC/CTL switches according to the reference signal used by each VTR's time counter. Normally set to TC; set to CTL, if 45-pin is selected or time codes are not to be used with 9-pin selected. When the switch is set to TC, the user bits can be checked during playback by pressing the button with TC on its front.

4. Set the BUMP switch to ON or OFF.
When set to ON, check DIP switch SW1-1 setting.

5. Set the PREROLL switch as required. When the preroll time is set to 10 seconds, it can be modified to 15 seconds using DIP switch SW1-5.

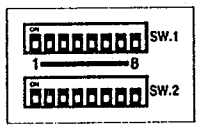
Colour framing mode selection

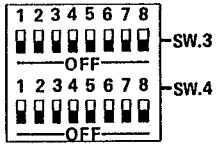
In 9-pin editing, the colour framing mode can be selected. Two DIP switches are provided for colour framing mode selection: one on the system setting panel and one on the rear panel. Initial settings of these switches are for the 4-field sequence mode.

6. To select the 2-field mode, set system setting panel DIP switch SW2-5 to ON.
To select the 8-field mode, set rear panel DIP switch SW4-3 to ON.

Other DIP switches

7. In 45-pin colour frame editing with the BUMP switch ON, set DIP switches SW2-2 and SW2-3 for editing accuracy of ±1 frame or rougher.
8. Confirm the other DIP switch settings and change as required. See pages 11 and 12.

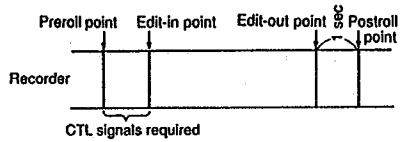




PREPARING RECORDING TAPES

For Assemble Edits

When starting assemble editing from the beginning of a tape, or after a blank in the middle of tape, CTL signals must be recorded before the first edit-in point for a period exceeding the preroll time.

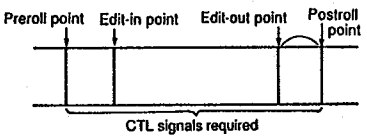


- Since the full erase head operates in assemble editing, a non-recorded segment is produced after the postroll point. If assemble editing is applied in the middle of a recorded tape, the picture will be distorted after the postroll point.

- **Preroll time**
It takes a few seconds for tape running to stabilize after starting. To ensure that tape running is stable before it reaches an edit point, the tape must start running before the edit-in point (prerolling). The preroll time can be set with the preroll time select switch.

For Insert Edits

Record CTL signals before editing. At minimum, CTL signals must be continuously recorded in the section shown in the figure below.



- To record CTL signals, connect a video camera or standard TV signal generator and record its output signal.
- The edit-in point cannot be specified at the very beginning of a tape. Allow for a section corresponding to the preroll time before the first edit-in point.

- **Postroll time**
When an edit is executed — either in actual or preview editing, the recorder will play back a short segment after the edit-out point. This is referred to as postrolling. The postroll time is one second in actual editing. However, to permit the section before and after the edit-out point to be checked more carefully, the postroll time in preview and review is set to 5 seconds. This can be changed to one second by setting rear panel DIP switch SW4-2 to ON.

PREPARING SYSTEM EQUIPMENT (for A/B roll editing)

To perform A/B roll editing, the two players' playback signals must be synchronized. When a special effects generator is used, each of the players should be connected to it through a time base corrector (TBC). Adjust the TBCs to match the phase of both players' playback signals. The subcarrier phase in particular may need to be adjusted as it is affected by the length of the connection cables.

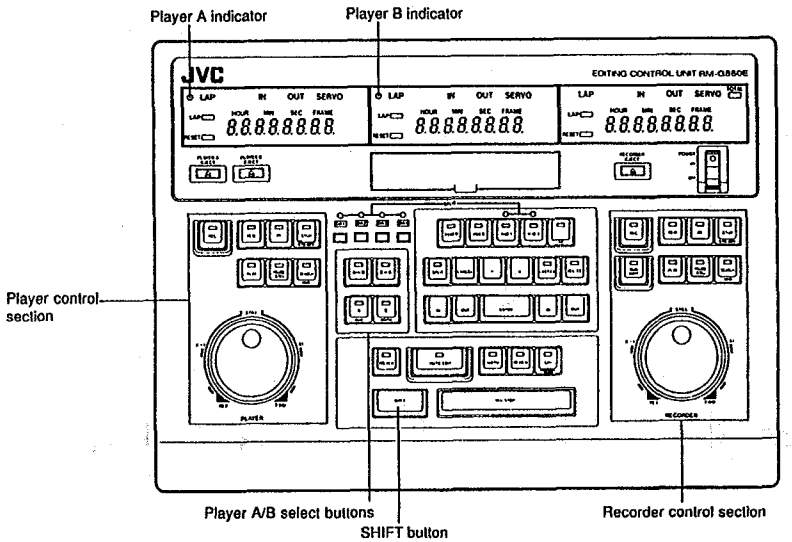
SETTING THE SPECIAL EFFECTS GENERATOR (for A/B roll editing)

① Select the type of effect to be used when switching the source. When a wipe effect is selected, select the WIPE pattern with the WIPE pattern select button, and set the WIPE position when the special effects generator has a positioner control.
② Set the required transition time for source switching.

- For more details refer to the instruction manual of the SEG.

REMOTE CONTROL OF PLAYERS AND RECORDER

The functions of the buttons and dials on the player and recorder control sections are identical to the corresponding buttons and dials on the connected VTRs.



SELECTION OF THE VTR TO BE CONTROLLED

- Before starting, select the player with the A or B button.
- When player A is selected, the LED in the A button and the player A indicator light. When player B is selected, the LED in the B button and the player B indicator light.
- The recorder is controlled from the recorder control section.

TAPE TRANSPORT CONTROL

For tape transport control, the following buttons in the corresponding section are used.

PLAY	:	to play back tape
FF	:	to fast forward tape
REW	:	to rewind tape
STOP	:	to stop tape
PAUSE/STILL	:	to stop recording temporarily or freeze a picture
SHIFT+STOP	:	standby off
REC + PLAY	:	to record

SEARCH CONTROL

Use the SEARCH button, SEARCH + SHIFT buttons, and JOG/SEARCH dials.

Shuttle Search

Turn the SEARCH dial (the outer dial). Continuous search is available in both directions, at a speed corresponding to the degree the dial is turned. Use to roughly locate edit points.

- When the dial is set to the center position (STILL), a still picture can be obtained.
- To run the tape in the forward direction, turn the dial in the FWD direction (clockwise); to run the tape in the reverse direction, turn the dial in the REV direction (counter-clockwise).
- When the SEARCH button is pressed, playback will resume at the speed already set by the SEARCH dial.
- When the dial is set to the x1 or x-1 click position, search will be at normal speed. When the SEARCH dial is set to the x1 click position, the internal sync mode is entered automatically.

- After setting the POWER switch to ON, pressing the SEARCH button may not engage the Search mode. In this case, turn the SEARCH dial fully in both directions to restore normal conditions.
  To cancel the Search mode, press either PLAY, PAUSE/STILL, FF, REW, STOP, or ALL STOP.

Jog Search

Turn the JOG dial (the inner dial). The tape can be played back in either direction corresponding to the speed with which the dial is turned. Use to locate edit points accurately.

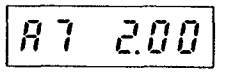
- To run the tape in the forward direction, turn the dial in the FWD direction (clockwise); to run the tape in the reverse direction, turn the dial in the REV direction (counter-clockwise).

Auto Tracking (AT) Playback

When using a VTR with an Auto Tracking (AT) function, playback speed can be controlled in the Variable mode.

- Press the SHIFT and SEARCH buttons simultaneously to enter the Variable mode. Playback speed can be varied between –1 and +2 times normal speed. Available speeds are (in percentage) 0, +/–3, +/–10, +/–20, +/–30, +/–40, +/–50, +/–70, +/–100, +150, and +200.

Time counter



2 times normal speed
Indicated in percentage

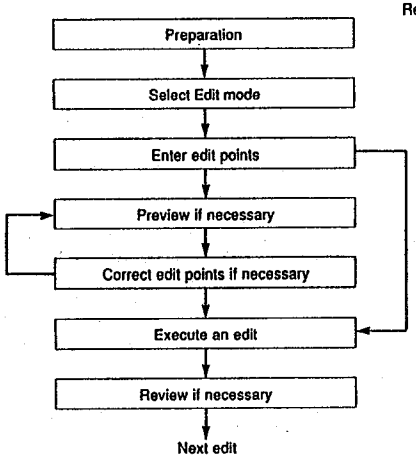
- The playback speed range is different with different VTRs.
  To cancel the AT mode, press FF, REW, STOP, SEARCH, or A or B select button.

BASIC EDITING (CUT EDITING)

One player and one recorder are used for cut editing.

OPERATING FLOWCHART

Refer to page 17 "PREPARATION".



SELECTING THE TYPE OF EDITING

Edit mode select buttons

Assemble Editing

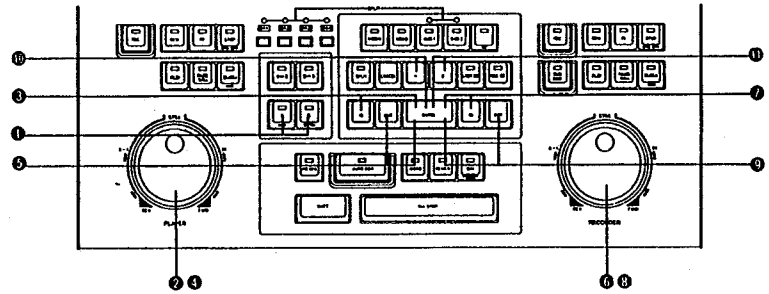
To perform assemble editing, press the ASSEM button. Its indicator will light when ON. Once editing has started, the button is disabled. In the Assemble Edit mode, all signals (AUD-1, AUD-2, VIDEO, Time code) are recorded.

Insert Editing

To perform insert editing, select the signal(s) to be inserted (VIDEO/AUD-1/AUD-2) by pressing the corresponding INSERT buttons. The buttons' indicators light when ON. To insert time code signals, press the SHIFT button and TC button (to the right of the AUD-2 button) simultaneously. During insert editing, any signals can be set to ON or OFF whenever necessary.

ENTRY OF EDIT POINTS

In assemble editing, enter the player's edit-in and -out points and the recorder's edit-in point. In insert editing, enter the edit-in points for the player and recorder and the edit-out point for either the player or the recorder. The other edit-out point is determined automatically.



Entering Player's Edit Points

❶ Select player A or B with the A or B button.
❷ Locate the edit-in point, and engage the Still mode.
❸ Press the ENTRY button while pressing the IN button for the player. The IN indicator in the time counter lights and the OUT indicator blinks.
❹ Locate the edit-out point, and engage the Still mode.
❺ Press the ENTRY button while pressing the OUT button for the player. The OUT indicator in the time counter lights.

Entering Recorder's Edit Points

❻ Locate the edit-in point, and engage the Still mode.
❼ Press the ENTRY button while pressing the IN button for the recorder. The IN indicator in the time counter lights and the OUT indicator blinks.

NOTE:
In 9-pin timecode-referenced editing, the last dot on the player's counter display lights if the colour frames at the recorder's and player's edit-in points do not match. To find out how many frames must be shifted for the colour frames to match, press the player IN button. The other player's display shows the colour frame shift in frames while the IN button is being pressed. Correct either the player's or recorder's edit-in point so that the indicated number of frames is "00". For correcting edit points, see page 25.

❽ Locate the edit-out point, and engage the Still mode.
❾ Press the ENTRY button while pressing the OUT button for the recorder. The OUT indicator in the time counter lights. The player's edit-out point (if entered before) will be cancelled.

- If the edit-in points for the player and recorder, and the edit-out point for the player have been entered, there is no need to enter the recorder's edit-out point.
- Edit points can be entered while in the Play mode or in the Search mode.

Simultaneous Entry of Edit Points for Player and Recorder

A single operation lets you enter the edit points for both the player and recorder.

⓾ To enter the edit-in points for both player and recorder at the same time, press the Minus (–) and ENTRY buttons simultaneously. The IN indicators in the time counters will light.
⓫ To enter the edit-out points for both player and recorder, press the Plus (+) and ENTRY buttons simultaneously. The OUT indicators in the time counters will light. If the edit-in points of player and recorder have already been entered, the edit-out point will be entered only for the player and the OUT indicator in the player's time counter will light.

Confirmation of Edit Points and Duration

<Confirming edit-in points>

- To confirm the counter data of the edit-in point, press the IN button for the player or the recorder as necessary. The corresponding IN indicator will blink and the data will be displayed for as long as the IN button is pressed.
- The edit-in points for both the player and recorder can be confirmed at the same time by pressing the Minus (–) button.

<Confirming edit-out points>

- To confirm the counter data of the edit-out point, press the OUT button for the player or the recorder as necessary. The corresponding OUT indicator will blink and the data will be displayed for as long as the OUT button is pressed.
- The edit-out points for both the player and recorder can be confirmed at the same time by pressing the Plus (+) button.

<Confirming the duration of edits>

- To confirm the duration of an edit, press the IN and OUT buttons simultaneously. The IN and OUT indicators blink and the duration of the edit is indicated.
- To confirm the durations of the edits for both the player and the recorder, press the Minus (–) and Plus (+) buttons simultaneously.

Access to Edit Points

<Accessing edit-in points>

- The edit-in point can be accessed by pressing the IN button while pressing the GOTO button.
- The edit-in points for both the player and recorder can be accessed at the same time by pressing the Minus (–) and GOTO buttons simultaneously.

<Accessing edit-out points>

- The edit-out point can be accessed by pressing the OUT button while pressing the GOTO button.
- The edit-out points for both the player and recorder can be accessed at the same time by pressing the Plus (+) and GOTO buttons simultaneously.

- If an edit-out point is specified at a point before the edit-in point, the edit-in point is automatically cancelled. If an edit-in point is specified at a point after the edit-out point, the edit-out point is automatically cancelled.
- As the duration of the player's edit and that of the recorder's edit are always equal, entering the edit-in points for the player and recorder and the edit-out point for either the player or recorder is sufficient; the other edit-out point is determined automatically.
- Using the time counter memory, counter data can be temporarily held in memory and then entered as an edit-in or edit-out point. See page 37, "TIME COUNTER MEMORY FUNCTION".

PREVIEW EDITING

Rehearsal editing can be performed using the preview function. The edited sequence can be "rehearsed" to ensure the edit-in and edit-out points are appropriate. In practice, however, this step can be omitted.

❶ Set both the player and recorder to the Still mode.
❷ Press the PREVIEW button. Both the player and recorder start to run as they would in actual editing. The picture can be monitored on the monitor connected to the recorder. (The video and audio signals of the edit are monitored in the E-E mode.)

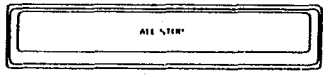
❸ When the PREVIEW button is pressed during preview editing, preview editing restarts from the beginning.

Out-Point Preview

❹ To view only the edit-out section, press the OUT and PREVIEW buttons simultaneously.
(This function is available only in cut editing.)

To Quit Preview

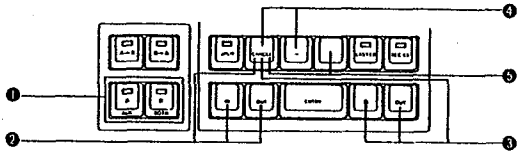
❺ To quit during preview editing, press the ALL STOP button. The player and recorder enter the Still mode.



CANCELLATION AND CORRECTION OF EDIT POINTS

Cancelling Edit Points

Entering a new edit point automatically cancels the previous edit point. To cancel an edit point without entering a new one, proceed as follows:



<Cancelling player's edit points>

❶ Select the player with the A or B select button.
❷ To cancel an edit-in or edit-out point, press the IN or OUT button and the CANCEL button simultaneously.
The IN or OUT indicator will go out.

<Cancelling recorder's edit points>

❸ To cancel an edit-in or edit-out point, press the IN or OUT button and the CANCEL button simultaneously.
The IN or OUT indicator will go out.

<Simultaneous cancellation of edit-in points>

❹ The edit-in points for both the player and recorder are cancelled simultaneously when the Minus (–) and CANCEL buttons are pressed simultaneously. The IN indicators will go out.

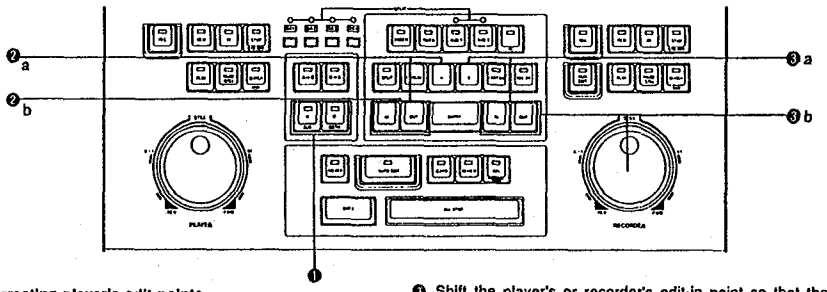
<Simultaneous cancellation of edit-out points>

❺ The edit-out points for both the player and recorder are cancelled simultaneously when the Plus (+) and CANCEL buttons are pressed simultaneously. The OUT indicators will go out.

- When the counter is in the CTL mode, pressing the RESET button not only resets the counter, but cancels the edit points.
- When the counter is in the TC mode, pressing the RESET button cancels the edit points.
- In both modes, if the RESET button is pressed while the lap time is displayed, the lap time is reset.

RESET

Correction of Edit Points



<Correcting player's edit points>

❶ Select the player with the A or B button.

❷a To shift edit points frame by frame, press the Minus (–) or Plus (+) button with the IN or OUT button depressed.

❷b This can also be done by turning the JOG dial on the recorder control section while pressing the IN or OUT button.

<Colour frame correction>

❶ Select the player with the A or B button.

❷ Press the player IN button.

- If the last dot on the player's counter display lights, the player's and recorder's colour frames do not match.
- The colour frame shift is indicated in frames on the other player's display while the IN button is being pressed.

❸ Shift the player's or recorder's edit-in point so that the indicated number of frames is "00".

❹ Check the picture at the corrected edit-in point. If it is not suitable as the start of a new edit, search for another tape position and check colour frame matching.

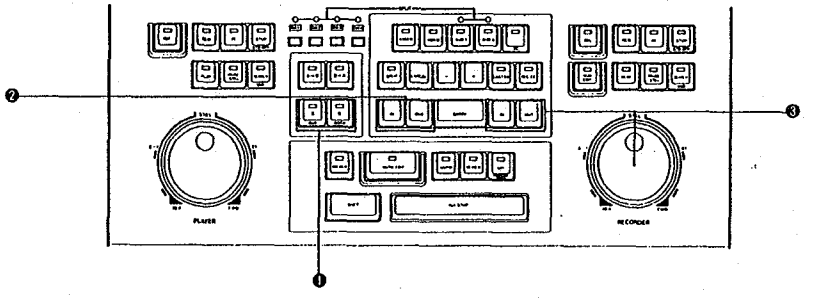
<Correcting recorder's edit points>

❸a To shift edit points frame by frame, press the Minus (–) or Plus (+) button with the IN or OUT button depressed.

❸b This can also be done by turning the JOG dial while pressing the IN or OUT button.

Correcting the duration of edits

This technique is convenient when the time of an edit is limited, especially in insert editing. The duration is modified by changing the edit-out point. Since the duration of an edit is identical for both the player and recorder, only one has to be modified.



<Correcting player's edit duration>

❶ Select the player with the A or B button.

❷ Turn the JOG dial on the recorder control section while pressing both the IN and OUT buttons.

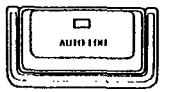
<Correcting recorder's edit duration>

❸ Turn the JOG dial while pressing both the IN and OUT buttons.

EXECUTION OF AN EDIT

❶ Set the player and recorder to the Still mode.

❷ Press the AUTO EDIT button.
Actual editing is started by the same procedure as preview editing. Editing stops automatically at the edit-out point. When editing is finished, the recorder plays back for the postroll time (1 sec), then rewinds automatically to the edit-out point and enters the Still mode. Editing will restart if the AUTO EDIT button is pressed while editing is in progress.

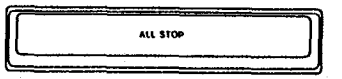


NOTE:

- If the number of retries is too many, set system setting panel DIP switch SW1-1 to ON.

To stop editing before the entered edit-out point is reached:

❸ *Press the ALL STOP button.*
Both the player and recorder enter the Still mode.



REVIEW

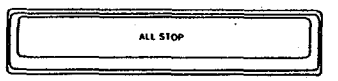
This procedure can be omitted if unnecessary.

❶ Press the REVIEW button.
The recorder rewinds the tape past the edit-in point, then starts playback. After it has passed the edit-out point, it enters the Still mode.

- The Review mode is released automatically 5 seconds after the edit-out point.

To release the Review mode before the edit-out point:

❷ Press the ALL STOP button. The recorder enters the Still mode.

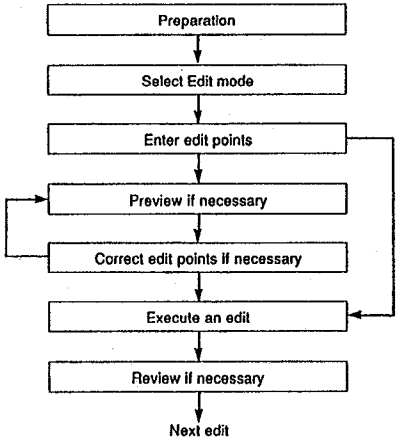


A/B ROLL EDITING

A/B roll editing refers to editing from two players with automatic switching between the two.

OPERATING FLOWCHART

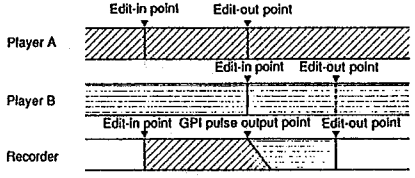
Refer to page 17 "PREPARATION".



Edit Points in A/B Roll Editing

Five edit points must be entered

In A/B roll editing, 6 edit points (3 edit-in points and 3 edit-out points for players A and B and the recorder) are involved. However, only 5 out of the 6 edit points need be entered. Once the 3 edit-in points and 2 edit-out points have been entered, the last edit-out point will be calculated and determined automatically. For example, when the edit-out and edit-in points for player A and the recorder, and the edit-in point for player B, have been entered, the edit-out point for player B will be determined automatically.



The GPI pulse output point is determined automatically. If you wish to change the timing of the GPI pulse output, refer to page 38, "GPI PULSE OUTPUT TIMING AND MANUAL TAKE PULSE OUTPUT".

Note on edit-out points

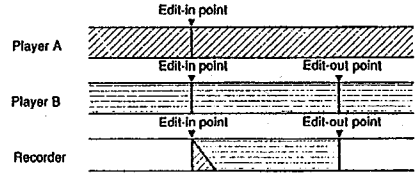
If the edit-out points are entered for both the recorder and player B and there is any discrepancy between them, the one entered last will be used to correct the other.

To apply special effects manually

A "manual take" pulse can be output from the GPI port at any time after the start of an edit by simultaneously pressing the GPI ADVANCE (MANUAL TAKE) and SHIFT buttons. In this case, the preset pulse output time is cancelled.

To apply special effects at the start of an edit

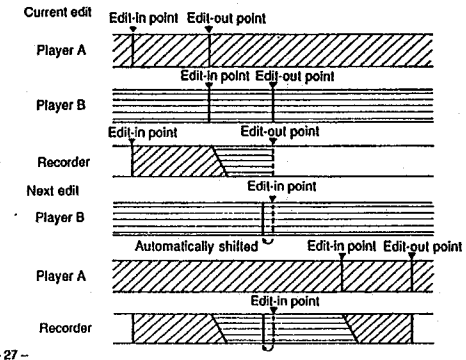
Do not enter an edit-out point for the player that is used first (player A in the figure below). When editing is started, special effects will be applied at the start of the edit as the edit-in point of player A is treated also as its edit-out point. That is, the duration of an edit specified for player A is zero.



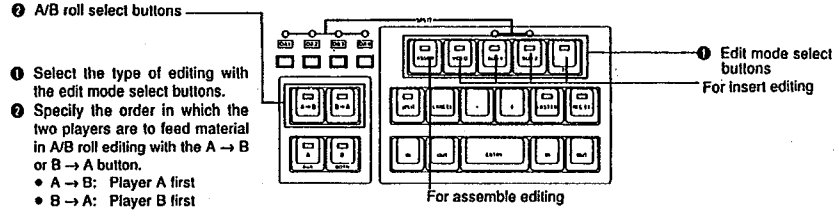
- The duration of edits of player B and recorder must be identical, or the edit-out point for the recorder should not be entered.

Match frame editing

More efficient A/B roll editing is possible when rear panel DIP switch SW4-8 is set to ON. On completion of one A/B roll edit, the recorder's edit-out point and the second player's (player B in this example) edit-out point are automatically registered as the edit-in points for the next edit. At the same time, the sequence of players is also automatically reversed (B → A in this example). Therefore, match frame editing is possible simply by setting the edit-in and -out points of the other player which now functions as the second player (player A in this example). And, thanks to the auto time tracking function, the first player's (player B in this example) edit-in point will be automatically shifted if the recorder's edit-in point is corrected, ensuring perfect match frame editing.



SELECTING THE TYPE OF EDITING AND PLAYER SEQUENCE



❶ Select the type of editing with the edit mode select buttons.
❷ Specify the order in which the two players are to feed material in A/B roll editing with the A → B or B → A button.
- A → B: Player A first
- B → A: Player B first

Assemble Editing

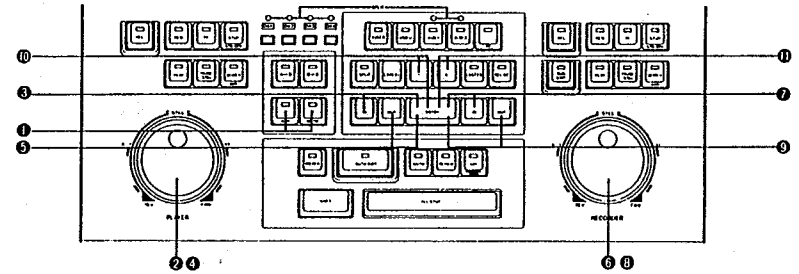
To perform assemble editing, press the ASSEM button. Its indicator will light when ON. Once editing has started, the button is disabled. In the Assemble Edit mode, all the signals (AUD-1, AUD-2, VIDEO, Time code) are recorded.

Insert Editing

To perform insert editing, select the signal(s) to be inserted (VIDEO/AUD-1/AUD-2) by pressing the corresponding INSERT buttons. The buttons' indicators light when ON. To insert time code signals, press the SHIFT button and TC button (to the right of the AUD-2 button) simultaneously. During insert editing, any signals can be set to ON or OFF whenever necessary.

ENTRY OF EDIT POINTS

Follow the procedure below to enter edit-in and edit-out points. Five of the 6 edit points (edit-in and edit-out points for each of players A and B and the recorder) must be entered. Edit points can be entered while in the Play mode or in the Search mode.



Entering Player's Edit Points

❶ Select player A or B with the A or B button.
❷ Locate the edit-in point, and engage the Still mode.
❸ Press the ENTRY button while pressing the player's IN button. The IN indicator in the time counter lights and the OUT indicator blinks.
❹ Locate the edit-out point, and engage the Still mode.
❺ Press the ENTRY button while pressing the player's OUT button. The OUT indicator in the time counter lights.

Repeat the same for the other player.

Entering Recorder's Edit Points

❻ Locate the edit-in point, and engage the Still mode.
❼ Press the ENTRY button while pressing the recorder's IN button. The IN indicator in the time counter lights and the OUT indicator blinks.

NOTE:
In 9-pin timecode-referenced editing, if the colour frames at the recorder's and the first roll player's edit-in points do not match, the last dot on that player's counter display lights. To find out how many frames must be shifted for the colour frames to match, press the player IN button. The other player's display shows the colour frame shift in frames while the IN button is being pressed. Correct either the player's or recorder's edit-in point so that the indicated number of frames is "00". For correcting edit points, see page 31.

❽ Locate the edit-out point, and engage the Still mode.
❾ Press the ENTRY button while pressing the recorder's OUT button. The OUT indicator in the time counter lights.

* If the three edit-in points for the players and recorder, and the two edit-out points for the players have already been entered, step 9 need not be performed.

Simultaneous Entry of Edit Points for Players and Recorder

A single operation lets you enter the edit points for all three VTRs.

❿ To enter the edit-in points for both players and recorder at the same time, press the Minus (–) and ENTRY buttons simultaneously. The IN indicators in the time counters will light.
⓫ To enter the edit-out points for both players and recorder, press the Plus (+) and ENTRY buttons simultaneously. The OUT indicators in the time counters will light. If the edit-in points for players A and B and the recorder have already been entered, the edit-out point for the recorder will not be entered.

Confirmation of Edit Points and Duration

<Confirming edit-in points>
- To confirm the counter data of the edit-in point, press the IN button for the player or the recorder as necessary. The corresponding IN indicator will blink and the data will be displayed for as long as the IN button is pressed.
- The edit-in points for both players and the recorder can be confirmed at the same time by pressing the Minus (–) button.

<Confirming edit-out points>
- To confirm the counter data of the edit-out point, press the IN button for the player or the recorder as necessary. The corresponding OUT indicator will blink and the data will be displayed for as long as the IN button is pressed.
- The edit-out points for both players and recorder can be confirmed at the same time by pressing the Plus (+) button.

<Confirming the duration of edits>
- To confirm the duration of an edit, press the IN and OUT buttons simultaneously. The IN and OUT indicators blink and the duration of the edit is indicated.
- To confirm the durations of the edits for both players and the recorder, press the Minus (–) and Plus (+) buttons simultaneously.

Access to Edit Points

<Accessing edit-in points>
- The edit-in point can be accessed by pressing the IN button while pressing the GOTO button.
- The edit-in points for both players and recorder can be accessed at the same time by pressing the Minus (–) and GOTO buttons simultaneously.

<Accessing edit-out points>
- The edit-out point can be accessed by pressing the OUT button while pressing the GOTO button.
- The edit-out points for both players and recorder can be accessed at the same time by pressing the Plus (+) and GOTO buttons simultaneously.

* If an edit-out point is specified at a point before the edit-in point, the edit-in point is automatically cancelled. If an edit-in point is specified at a point after the edit-out point, the edit-out point is automatically cancelled.
* Using the time counter memory, counter data can be temporarily held in memory and then entered as an edit-in or edit-out point. See page 37, "TIME COUNTER MEMORY FUNCTION".

PREVIEW EDITING

Rehearsal editing can be performed using the preview function. The edited sequence can be "rehearsed" to ensure the edit-in and edit-out points are appropriate. In practice, however, this step can be omitted.

❶ Set player A, player B, and recorder to the Still mode.
❷ Press the PREVIEW button. Player A, player B, and the recorder start to run as they would in actual editing. The picture can be monitored on the monitor connected to the recorder. (The video and audio signals of the edit are monitored in the E-E mode.)

❸ When the PREVIEW button is pressed during preview editing, preview editing restarts from the beginning.

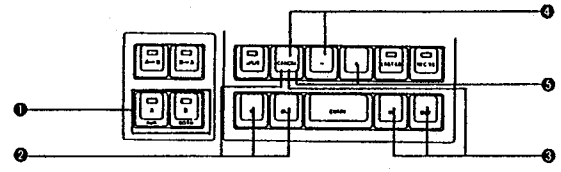
To Quit Preview

❹ To quit during preview editing, press the ALL STOP button. All three VTRs enter the Still mode.

CANCELLATION AND CORRECTION OF EDIT POINTS

Cancelling Edit Points

Entering a new edit point automatically cancels the previous edit point. To cancel an edit point without entering a new one, proceed as follows:



<Cancelling player's edit points>
❶ Select the player with the A or B button.
❷ To cancel an edit-in or edit-out point, press the IN or OUT button and the CANCEL button simultaneously.
The IN or OUT indicator will go out.

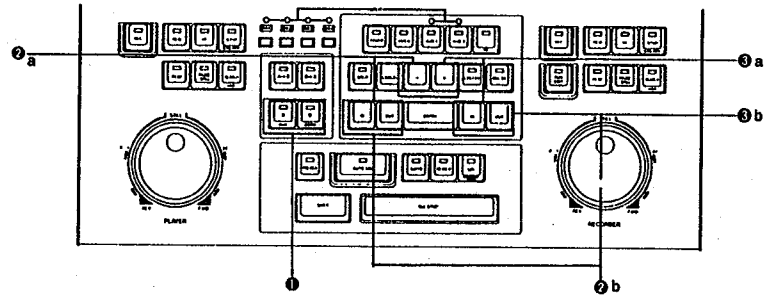
<Cancelling recorder's edit points>
❸ To cancel an edit-in or edit-out point, press the IN or OUT button and the CANCEL button simultaneously.
The IN or OUT indicator will go out.

<Simultaneous cancellation of edit-in points>
❹ The edit-in points for both players and recorder are cancelled simultaneously when the Minus (–) and CANCEL buttons are pressed simultaneously. The IN indicators will go out.

<Simultaneous cancellation of edit-out points>
❺ The edit-out points for both players and recorder are cancelled simultaneously when the Plus (+) and CANCEL buttons are pressed simultaneously. The OUT indicators will go out.

* When the counter is in the CTL mode, pressing the RESET button not only resets the counter, but cancels the edit points.
* When the counter is in the TC mode, pressing the RESET button cancels the edit points.
* In both modes, if the RESET button is pressed while the lap time is displayed, the lap time is reset.

Correction of Edit Points



<Correcting player's edit points>

❶ Select the player with the A or B button.

❷a To shift edit points frame by frame, press the Minus (–) or Plus (+) button with the IN or OUT button depressed.

❷b This can also be done by turning the JOG dial on the recorder control section while pressing the IN or OUT button.

<Colour frame correction>

- When the A → B mode is selected, colour frame shift between player A and recorder can be corrected. When the B → A mode is selected, colour frame shift between player B and recorder can be corrected.

❶ Press the player IN button.

- If the last dot on the first roll player's counter display lights, the player's and recorder's colour frames do not match.
- The colour frame shift is indicated in frames on the other player's display while the IN button is being pressed.

❷ Shift the player's or recorder's edit-in point so that the indicated number of frames is "00".

❶ Check the picture at the corrected edit-in point. If it is not suitable as the start of a new edit, search for another tape position and check colour frame matching.

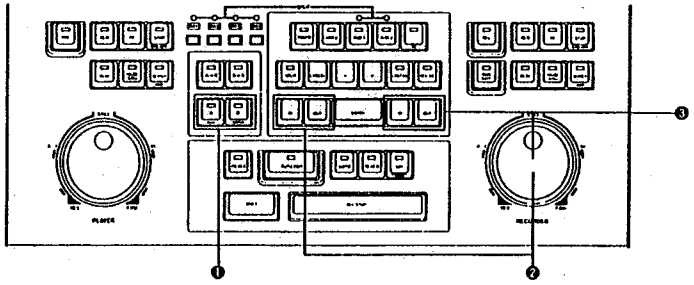
<Correcting recorder's edit points>

❸a To shift edit points frame by frame, press the Minus (–) or Plus (+) button with the IN or OUT button depressed.

❸b This can also be done by turning the JOG dial while pressing the IN or OUT button.

Correcting the Duration of Edits

This technique is convenient when the time of an edit is limited, especially in insert editing. The duration is modified by changing the edit-out point.



<Correcting player's edit duration>

❶ Select the player with the A or B button.

❷ Turn the JOG dial on the recorder control section while pressing both the IN and OUT buttons.

<Correcting recorder's edit duration>

❸ Turn the JOG dial while pressing both the IN and OUT buttons.

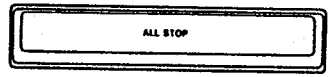
EXECUTION OF AN EDIT

❶ Set player A, player B, and recorder to the Still mode.

❷ Press the AUTO EDIT button.
Actual editing is started by the same procedure as preview editing. Editing stops automatically at the edit-out point. When editing is finished, the recorder plays back for the postroll time (1 sec), then rewinds automatically to the edit-out point and enters the Still mode. Editing will restart if the AUTO EDIT button is pressed while editing is in progress.

To stop editing before the entered edit-out point is reached:

❸ Press the ALL STOP button.
All three VTRs enter the Still mode.



REVIEW

This procedure can be omitted if unnecessary.

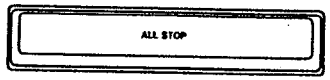
❶ Press the REVIEW button.

The recorder rewinds the tape past the edit-in point, then starts playback. After it has passed the edit-out point, it enters the Still mode.

* The Review mode is released automatically 5 seconds after the edit-out point.

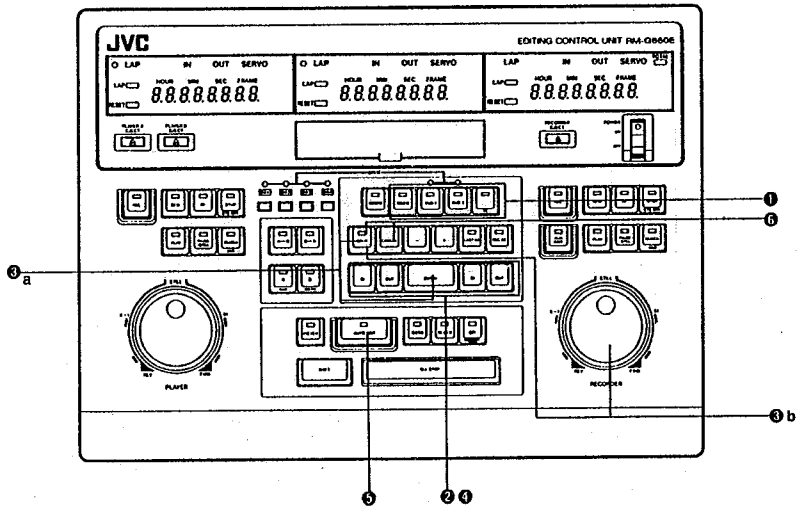
To release the Review mode before the edit-out point:

❷ Press the ALL STOP button. The recorder enters the Still mode.



AUDIO SPLIT EDITING

Audio split editing is a type of insert editing in which the edit-in point for the audio signal is entered independently of that for the video signal. Edit-in points for the AUD-1 and AUD-2 signals cannot be entered independently.



❶ Press the INSERT buttons (VIDEO, AUD-1, AUD-2, TC) corresponding to the signals to be inserted. To insert time code signals, press the SHIFT and TC buttons simultaneously.

❷ Enter the edit-in points for both the player and the recorder. These edit-in points serve as the video edit-in points.

❸a (While monitoring the sound and picture)
Determine the audio edit-in point for the recorder, and engage the Still mode. Press the SPLIT and ENTRY buttons simultaneously.

❸b (For setting in time)
Turn the JOG dial while pressing the SPLIT button; clockwise to set the audio edit-in point ahead of the video edit-in point, and counterclockwise to delay the audio edit-in point with respect to the video edit-in point.

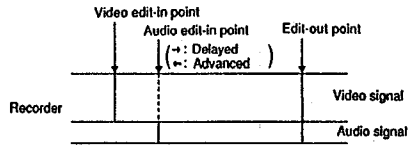
Counter Display

	Left time counter (for player A)	Middle time counter (for player B)	Right time counter (for recorder)
Advanced	Ad		-2.12
Delayed	dLY		2.12

When the edit-in point for the audio signal is entered, the corresponding SPLIT indicator lights.

❹ Enter the edit-out point for either the player or recorder. (Both video and audio signals have the same edit-out point.)

❺ Press the AUTO EDIT button.



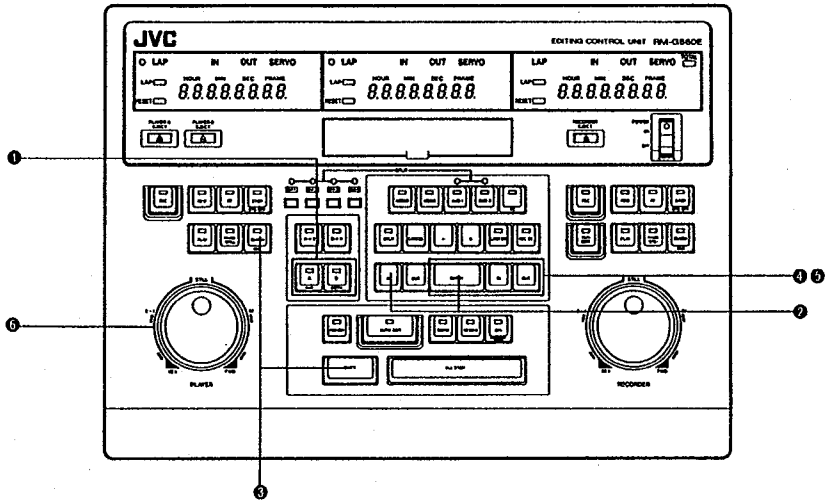
❻ To cancel the Split Edit mode, press the SPLIT and CANCEL buttons simultaneously.

* The Split Edit mode is entered even when one SPLIT indicator is lit.

NOTE:
- Audio split editing cannot be applied in AT editing.

AT (AUTO TRACKING) EDITING

Still pictures and variable speed playback pictures can be used as source material in editing, when a VTR with an AT function is used as the player (connected via a 9-pin connector).



❶ Press the A or B button to select the VTR equipped for AT playback.

❷ Enter the edit-in point for the selected player.

❸ Press the SHIFT and SEARCH buttons simultaneously to engage the variable speed playback mode.

❹ Enter the edit-in point for the recorder.

❺ Enter the edit-out point for the recorder.

❻ Turn the player SEARCH dial to select the desired speed. The Still mode can be selected if required.
See page 20, "AT (Auto Tracking) Playback".

❼ Follow the normal editing procedure.

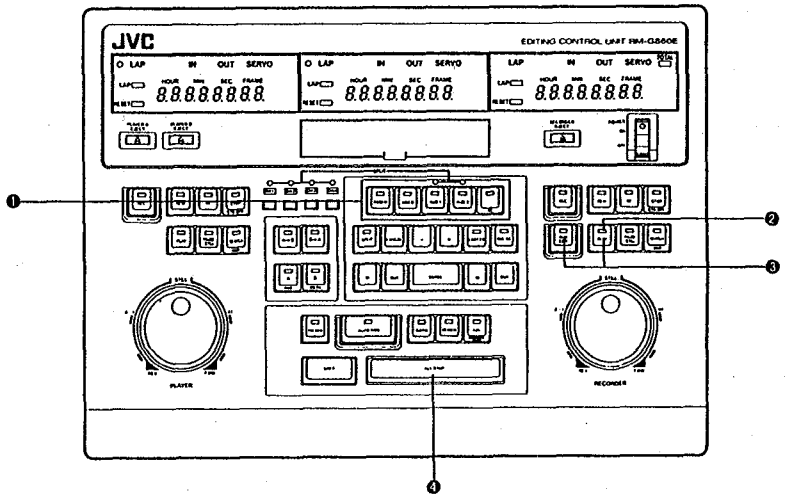
* The edit-out point for the player cannot be entered.
* The playback speed can be changed as required with the SEARCH dial, even while editing is in progress.
* AT editing cannot be applied in A/B roll editing.
* The capstan bump function is disabled in AT editing. Edit-in point shifting of a few frames might occur.
* Audio split editing cannot be applied in AT editing.

<To confirm the speed of AT playback>
Press the SHIFT and SEARCH buttons simultaneously. The selected speed is indicated in percentage on the other player's time counter.

<To cancel AT playback>
Press the FF, REW, STOP, ALL STOP, or A or B select button.

RUN EDITING

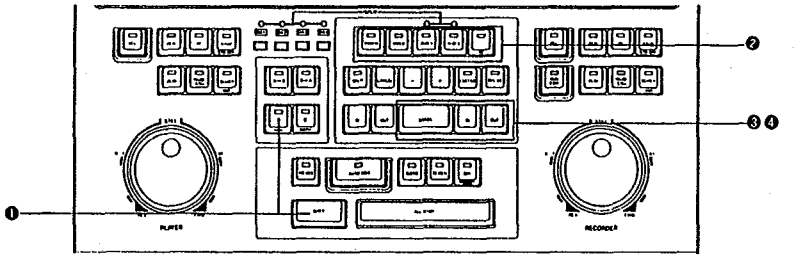
Connect a video camera or a VTR to the recorder, and supply audio and video signals. Editing is started while the recorder is in the Play mode.



❶ Select the required edit mode.
❷ Press the PLAY button for the recorder to start playback.
❸ Press the RUN EDIT and PLAY buttons simultaneously at the desired edit-in point. The recorder will start recording.
❹ Press the ALL STOP button at the edit-out point. The recorder will enter the Still mode.

INDEPENDENT EDITING

Connect a video camera or a VTR to the recorder, and supply audio and video signals. Without using player A or B, automatic editing is possible by entering the edit-in and edit-out points for the recorder.



❶ Press the SHIFT and A buttons simultaneously to engage the AUX mode.
❷ Select the type of editing.
❸ Enter the edit-in point for the recorder.
❹ Enter the edit-out point for the recorder
❺ Follow the normal editing procedure.

TIMECODE-REFERENCED EDITING

The RM-G860U incorporates a time code reader to allow editing in reference to time codes. Reading of time codes is possible only with equipment controlled via the 9-pin remote control terminal.

SETTING TO THE TIME CODE MODE

Set the TC/CTL switch, located on the system setting panel, to "TC".

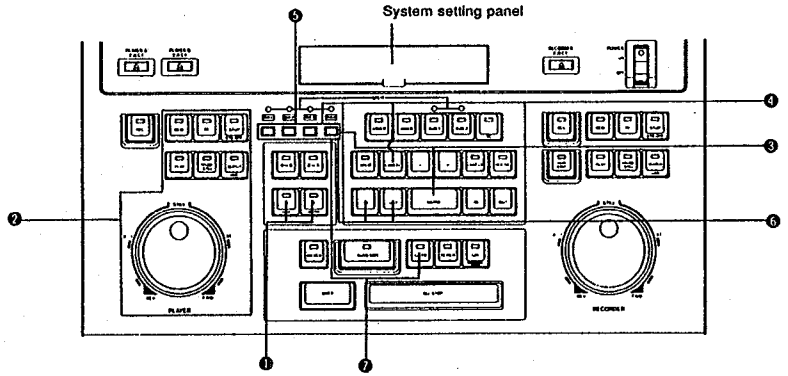
TO READ USER BITS

The user bits are displayed on the time counter while the TC button is being pressed.

TIME COUNTER MEMORY FUNCTION

When determining edit points for the players, data for up to 4 counter readings can be temporarily stored in memory as possible edit points. Later they can be entered as determined edit points or located using the Go-To function.

Preparation
Set DIP switch SW2-1 (located on the system setting panel) to "OFF". (The preset position of this switch is OFF.)



Storing Counter Data

❶ Select the player with the A or B button.
❷ Control the player with the buttons on the player control section and engage the Still mode at the position to be stored in memory.
❸ Press one of the DA buttons and the ENTRY button simultaneously. The DA button lights and the time counter data has been stored in memory.

- Store other counter data in the same way by pressing an unused DA button and the ENTRY button.
- DA buttons which are lit are already occupied.
- If new data is stored, the existing data is cancelled.

Cancelling Counter Data

❹ Press the DA button corresponding to the data you wish to cancel and the CANCEL button simultaneously. The button will go out and the memory will be empty.

Confirming Stored Data

❺ Press the DA button corresponding to the counter data you wish to check. The counter data will be displayed on the time counter of the corresponding player.

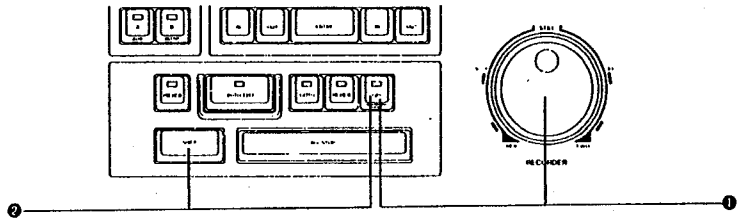
Transfer of Stored Data as Edit Points

❻ Press the IN or OUT button while pressing the DA button corresponding to the counter data you wish to use as an edit point. The IN or OUT indicator will light and the time counter data will be transferred to the edit point memory.

Access to Tape Position Corresponding to Stored Data

❼ Press the DA button corresponding to the counter data you wish to access together with the GOTO button. The player will search for the point and engage the Still mode.

GPI PULSE OUTPUT TIMING AND MANUAL TAKE



Setting GPI Output Timing

In A/B roll editing, the GPI pulse can be output before or after the edit-in point.

❶ Turn the JOG dial for the recorder while pressing the GPI ADVANCE button to set the GPI pulse output point with respect to the edit-in point.

Counter Display

	Left time counter (for player A)	Middle time counter (for player B)	Right time counter (for recorder)
Advanced	GP IAd		-2.12
Delayed	GP IdLY		2.12

Shifting GPI-2 Output Timing Relative To GPI-1

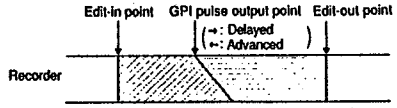
It is also possible to advance or delay the GPI-2 pulse output (for audio mixer) relative to the GPI-1 pulse output (for video switcher).

❶ Turn the recorder JOG dial while pressing the GPI ADVANCE and DA-1 buttons simultaneously to set the GPI-2 pulse output point with respect to the GPI-1 pulse output point.

Advanced	A-GP IAd	-2.12
Delayed	A-GP IdLY	2.00

Manual Take Pulse Output

❼ Press the GPI ADVANCE button together with the SHIFT button to output the manual take signal. If the manual take signal is output before the A/B switching point, the GPI pulse is not output at the A/B switching point.

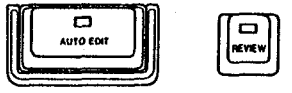


REC EE FUNCTION

Input signals supplied to the recorder can be monitored on a monitor connected to the recorder. The REC EE function is convenient when using a single monitor in editing.

Press the REC EE button. The button's indicator will light and the monitor connected to the recorder will display the input signal from the player.

To cancel the REC EE mode, press the REC EE button again. Pressing the AUTO EDIT or PREVIEW button cancels the REC EE mode automatically and engages the selected mode.



- With DIP switch SW1-3 (located on the system setting panel) set to "ON", the REC EE mode is automatically entered when the player is operated, and automatically cancelled when the recorder is operated. This function is especially useful in single-monitor editing.

NOTE:
When the REC EE button is ON, the time counter may be unstable and continue counting when the player or recorder enters the Still mode in VITC-referenced editing using the BR-S611E/811E with the SA-F911E Interface Unit (optional). This has no effect on actual editing.

SIMULTANEOUS CONTROL OF TWO PLAYERS

Players A and B can be operated simultaneously.
Use this function to locate edit points in A/B roll editing.

Press the B button together with the SHIFT button. Both the A and B buttons light and both player indicators in the time counters will light. (BOTH mode)

INFORMATION ON THE COUNTER DISPLAY

ERROR MESSAGES

Display	Status
LocAL	This display warns that the corresponding VTR's REMOTE/LOCAL select switch is set to LOCAL. Appears when any of the tape control buttons is pressed.(Not displayed with some VTRs.)
no TAPE	Available only with 9-pin VTRs, this display warns that no tape is loaded. Appears when any of the tape control buttons is pressed. (Not displayed with some VTRs.)
noSELECT	This display shows that the corresponding player cannot be operated since the recorder is in the AUX mode.
. . .	With 9-pin VTRs, this display warns that power is not supplied to the VTR. With 45-pin VTRs, it warns that power is not supplied or no tape is loaded.
Po oFF	Displayed when the PREVIEW or AUTO EDIT button is pressed, this display warns that power is not supplied to the VTR.

OTHER INDICATIONS

(1) Colour frame matching indication
Available when the edit-in point is entered or corrected.
(With DIP switch SW2-5 set to OFF in 9-pin editing)

00.00.00.00 ← With this dot : Colour frames do not match.
Without this dot : Colour frames match.

(2) Colour frame lock error indication
(In 9-pin editing only)

Err . .CF — This display appears on the corresponding counter display if the recorder fails to lock to the colour frames of the reference video signal when editing or preview editing is started.

(3) Colour frame shift indication
This display indicates how many frames the player's edit-in point is shifted with respect to the recorder's edit-in point. Available on the player display not being used while the player IN button is being pressed.
(With DIP switch SW2-5 set to OFF in 9-pin editing)

8-field colour framing mode

- . . .01 — One frame is shifted in reverse.
. . .00 — Colour frames match.
. . .01 — One frame is shifted forward.
. . .02 — Two frames are shifted forward.

4-field colour framing mode

. . .00 — Colour frames match.
. . .01 — One frame is shifted.

(4) Audio edit-in point in split editing

Left time counter (for player A)	Middle time counter (for player B)	Right time counter (for recorder)
Ad (Advanced)		-2.12
dLY (Delayed)		2.12

(5) GPI pulse output point

Left time counter (for player A)	Middle time counter (for player B)	Right time counter (for recorder)
9P 1Ad (Advanced)		-2.12
9P 1dLY (Delayed)		2.12

(6) GPI-2 pulse output point

Left time counter (for player A)	Middle time counter (for player B)	Right time counter (for recorder)
A-9P 1Ad (Advanced)		-2.12
A-9P 1dLY (Delayed)		2.00

CONNECTOR SPECIFICATIONS

9-Pin Connector

Pin No.	Signal
1	GND
2	RECEIVE A
3	TRANS B
4	GND
5	—
6	GND
7	RECEIVE B
8	TRANS A
9	GND

45-Pin Connector

Pin No.	Signal		Pin No.	Signal	
1	GND ◁		21	V SPEED CTL ◁	ANNALOG
2	REC CMD ◁		22	EDIT TALLY ▷	
3	PLAY CMD ◁		23	STILL TALLY ▷	
4	STOP CMD ◁		24	SEARCH TALLY ▷	
5	FF CMD ◁		25	PREROLL TALLY ▷	
6	REW CMD ◁		26	FF TALLY ▷	
7	FWD CMD ◁		27	PLAY TALLY ▷	
8	SEARCH CMD ◁		28	STOP TALLY ▷	
9	REV CMD ◁		29	REW TALLY ▷	
10	STILL CMD ◁		30	REC TALLY ▷	
11	PREROLL CMD ◁		31	TAPE REV ▷	
12	E.START CMD ◁		32	CTL PULSE ▷	
13	E.STOP CMD ◁		33	NC ▷	
14	PREVIEW CMD ◁		34	12V DC ▷	
15	REMOTE CMD ◁		35	CAP FG ▷	
16	A1 INS CMD ◁		36	EE CMD ◁	
17	A2 INS CMD ◁		37	X2 CMD ◁	
18	V INS CMD ◁		38		
			39	X1/5 CMD ◁	
19	SERVO LOCK ▷		40	DFR STOP CMD ◁	
			41	X1 CMD ◁	
20	ASSEM CMD ◁		42	EXTERNAL CAP SEARCH ◁	
			43	VHS ▷	L
			44		
			45	EJECT CMD ◁	

◁ FROM RM-C860 TO VTR ▷ FROM VTR TO RM-C860

PULSE STATUS

SPECIFICATIONS

Power : AC 102 — 240 V, 50/60 Hz
Power consumption : 24 W
Weight : 4.8 kg
Dimensions : 430(W) x 99(H) x 311(D) mm
Operating temperature : 0°C to 40°C
Storage temperature : -20°C to 60°C

VTR control functions : PLAY, REC, FF, REW, STOP, PAUSE/STILL, SHUTTLE SEARCH, JOG, EJECT

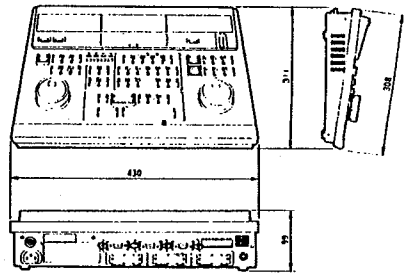
Editing control functions
- Edit modes : Assemble and Insert
- Editing reference : EBU time code or CTL pulse
- Editing accuracy : Timecode-referenced in capstan bump mode: ±0 frame (depending on VTR)
  CTL-referenced in capstan bump mode: ±2 frames (depending on VTR)

Memory capacity : 1-event
Preroll time : 5, 7, 10 sec
VTR interface : 9-pin serial, 45-pin parallel
Number of VTRs controllable : 2 players and 1 recorder
Number of VTRs connectable : 4 players and 2 recorders
Applicable VTRs :
- As players : KR-M840E/KR-M820E/KR-M800E/KR-M545E/KR-M540E/PR-900E/PR-600E — Direct
- As players : BR-S811E/BR-S611E/BR-S810E/BR-S610E — Direct or via SA-F911E
- As recorders : KR-M840E/KR-M820E/KR-M800E/PR-900E — Direct
- As recorders : BR-S811E/BR-S810E — Direct or via SA-F911E

SYNC IN : 0.2 to 5.0 Vp-p, negative sync, 75-ohms, unbalanced
GPI : Open-collector output

Counter display
- Time counter : up to 23 hours, 59 minutes, 59 seconds, 24 frames (TC mode)
  from -9 hours to 9 hours, 59 minutes, 59 seconds, 24 frames (CTL mode)
- Display : Total/lap time, IN/OUT points, Servo, Duration, Split edit-point, AT speed, GPI output point, Errors, 9-pin users bits, counter memory

Display elements : LED



(unit: mm)

* Design and specifications subject to change without notice.

SECTION 1
GENERAL DESCRIPTION AND DISASSEMBLY

1.1 REMOVAL OF EXTERNAL COVERS

Remove 5 screws (1) and disconnect connector from the MAIN CPU board to separate the top cover and main chassis.

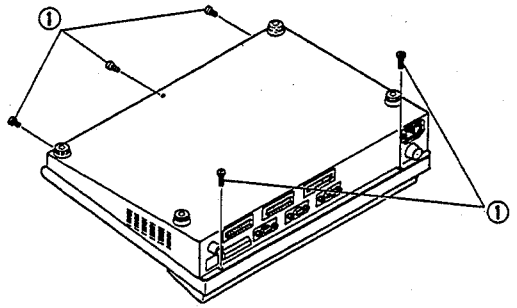


Fig. 1-1

1.2 REMOVAL OF MAIN BOARDS

1. CONNECTOR BOARD

Remove 4 screws (2) and disconnect connector from the MAIN CPU board.

2. MAIN CPU BOARD

Take off the CONNECTOR board. Next, remove 10 screws (3) and disconnect connector from the switching regulator.

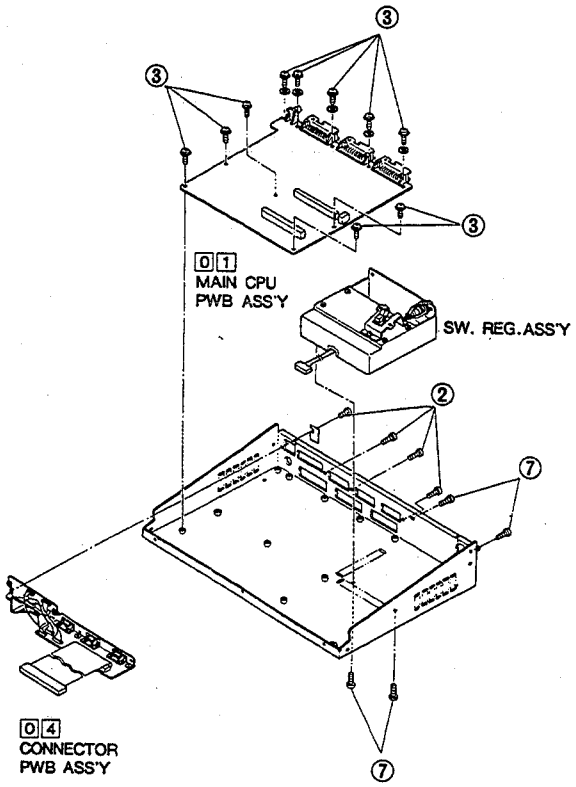


Fig. 1-2

3. OPERATION BOARD

Remove 12 screws (4) and disconnect connector from the SEARCH/JOG CONTROL board.

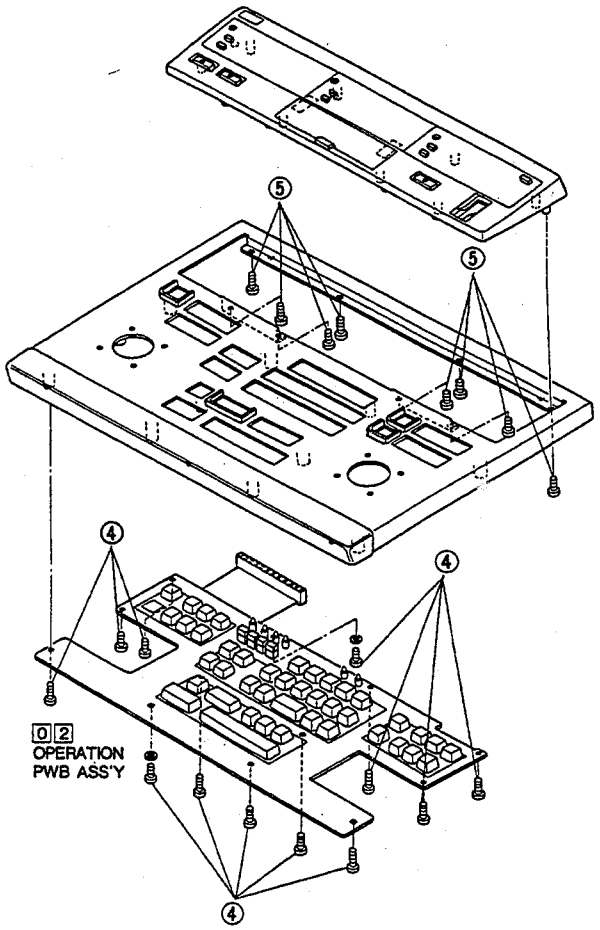


Fig. 1-3

4. DISPLAY BOARD

Remove 8 screws (5) from the panel and take off the DISPLAY assembly. Remove 8 screws (6) and take off the DISPLAY board from the DISPLAY assembly.

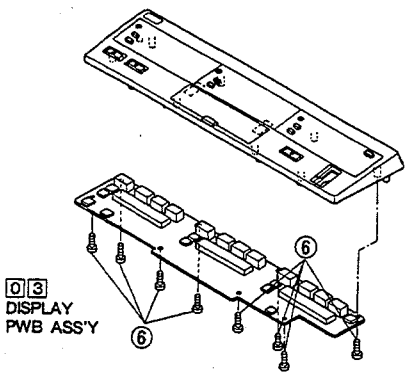


Fig. 1-4

1.3 REMOVAL OF SWITCHING REGULATOR ASSEMBLY

Remove 4 screws ⑦. Refer to Fig. 1-2.

1.4 REMOVAL OF SEARCH/JOG CONTROL ASSEMBLY

1. **Position the search/jog knob as indicated in Fig. 1-5.**
2. **Remove the outer rubber ring (tire) ①.**
3. **Insert a metric hex wrench (1.5 mm) into hole A and loosen the setscrew ②. Remove the jog knob ③.**
4. **Remove 3 screws ④ and remove the search knob ⑤.**
5. **Remove 4 screws ⑥ and remove the SEARCH/JOG CONTROL assembly.**

Note:
Do not remove the JOG board from the SEARCH/JOG CONTROL assembly. Since adjustment requires a special fixture, the board is not replaced separately.

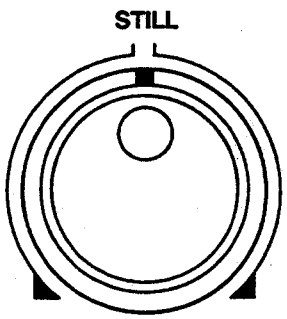


Fig. 1-5 Search/jog knobs position

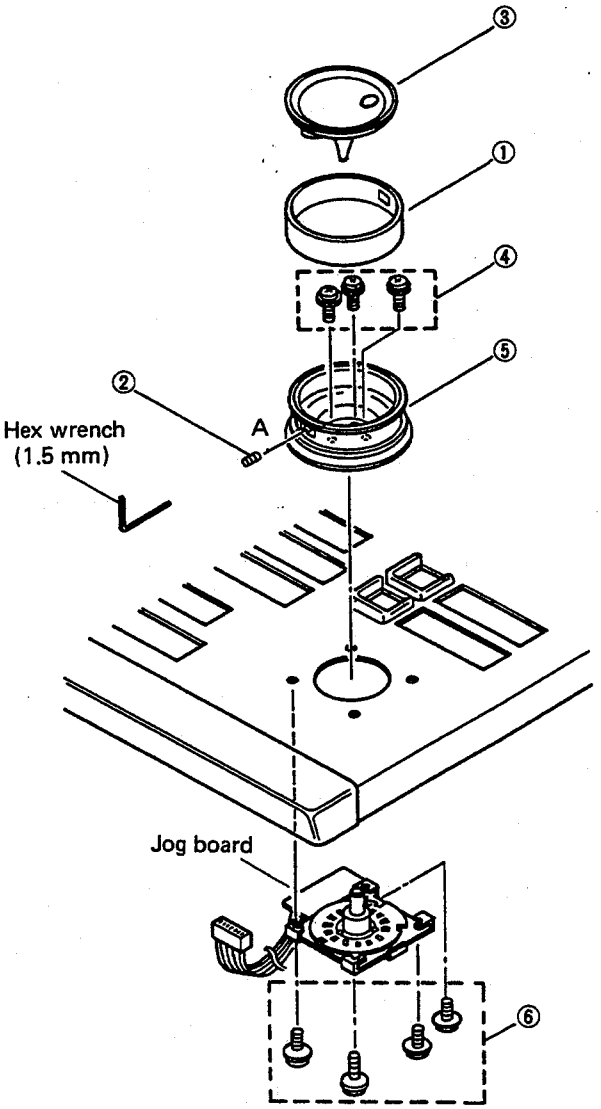


Fig. 1-6 Search/jog knobs and control assembly

1.5 COMBINATION FOR SYSTEMATIZATION

1.5.1 Note of combination

The RM-G860E is an A/B roll editing controller especially designed to combine with JVC VTRs.
Connectable JVC VTRs are as follows.

	Connectable VTR s
Player	S-VHS: BR-S610E/611E/810E/811E MII: KR-M800E/820E/840E/545E/540E VCR: PR-900E/600E
Recoder	S-VHS: BR-S810E/811E MII: KR-M800E/820E/840E VCR: PR-900E

Note:

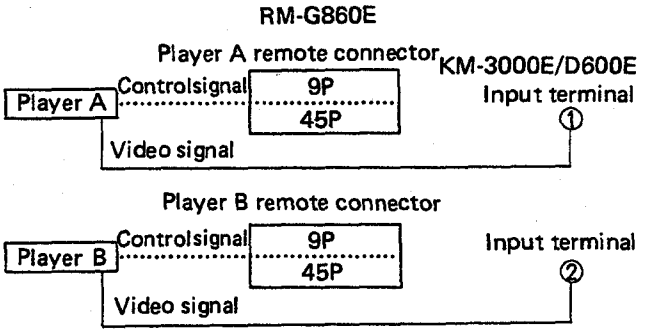
1) Connection with other VTRs (made by SONY in particular) with the 9-pin connectors may cause malfunction of the system since those models and versions of Betacam, 3/4" format VTR, etc. are different in the protocol.
2) If it is requested to develop a special ROM proper to the specifications of another VTR, it is charged a fee.
3) In the event that the ROM does not deal with connected other made VTRs, consult the manufacturer.

1.5.2 Time code editing with the 11/10 series VTRs

For time code editing with BR-S610E/S611E/S810E/S811E VTRs, the interface unit SA-F911E is required.

1.5.3 Connection with KM-3000E/KM-D600E

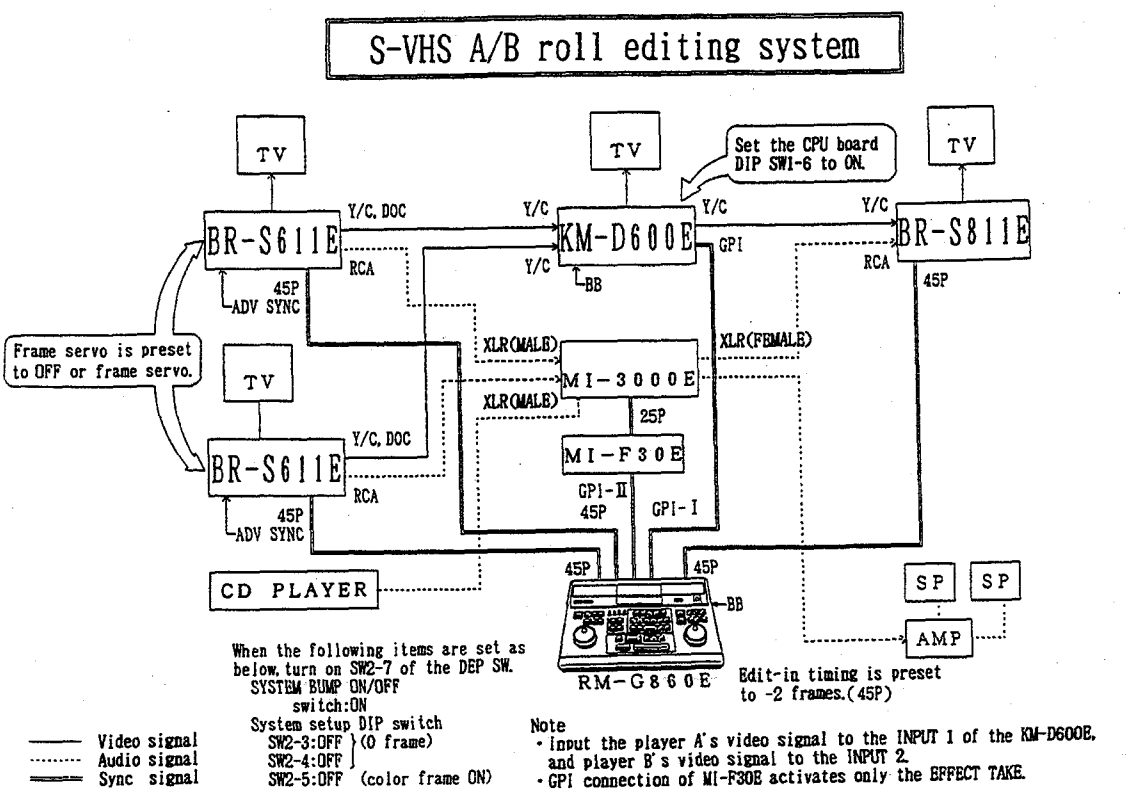
Number of video players connectable with the RM-G860E is four units (two with 9-pin connectors and other two with 45-pin connectors) at maximum. However, when the KM-3000E/KM-D600E is connected in the system, connectable players are limited to 2 units. When three or more VTRs connected with the player terminals of the RM-G860E are used, change the connections since the GPI selector is incapable of dealing with.
In practice, connect the player A's control and video output signals to the "player A remote connector (9-pin or 45-pin)" of the RM-G860E and the "input 1" of the KM-3000E/D600E, while connect the player B's control and video output signals to the "player B remote connector (9-pin or 45-pin)" of the RM-G860E and the "input 2" of the KM-3000E/D600E.



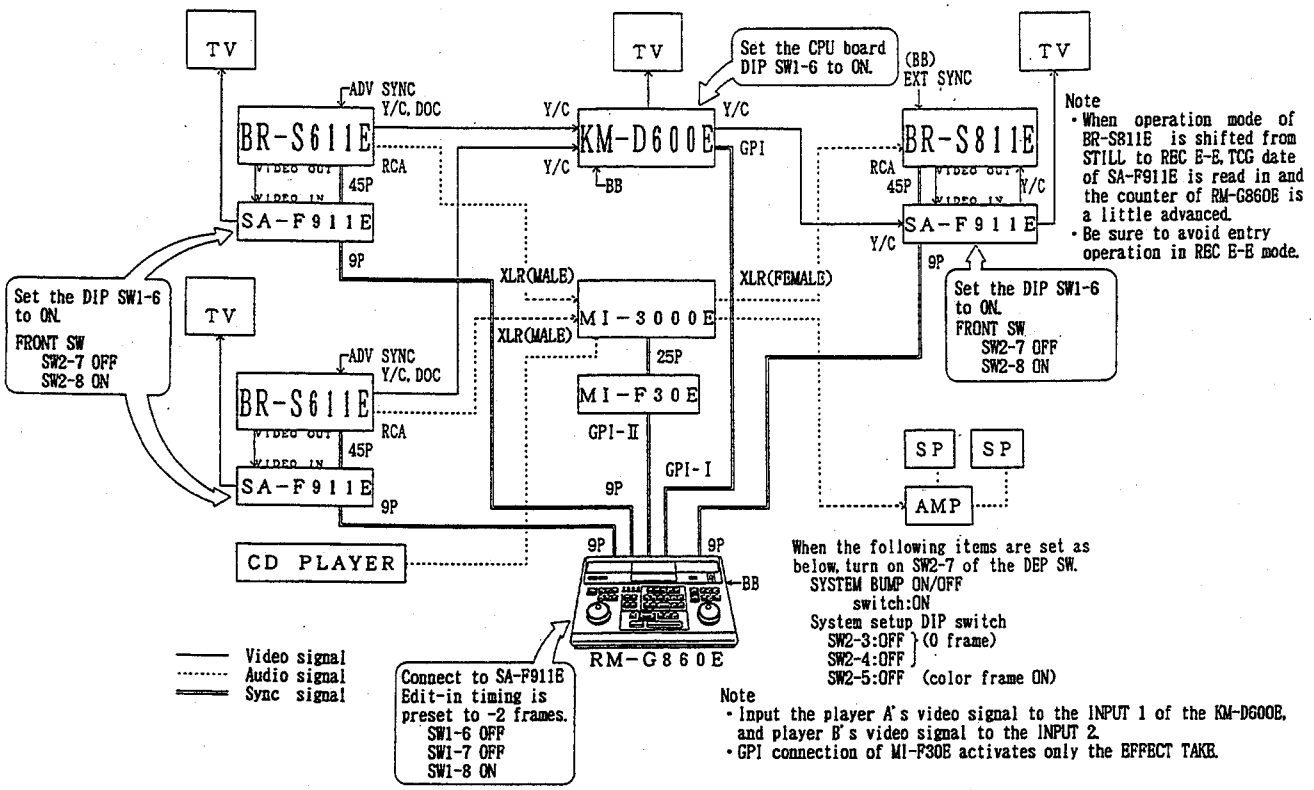
Note:

The key [A] of RM-G860E and the bus "1" of KM-3000E/D600E and the key [B] and the bus "2" are respectively interlocked with GPI signal.

CONNECTION

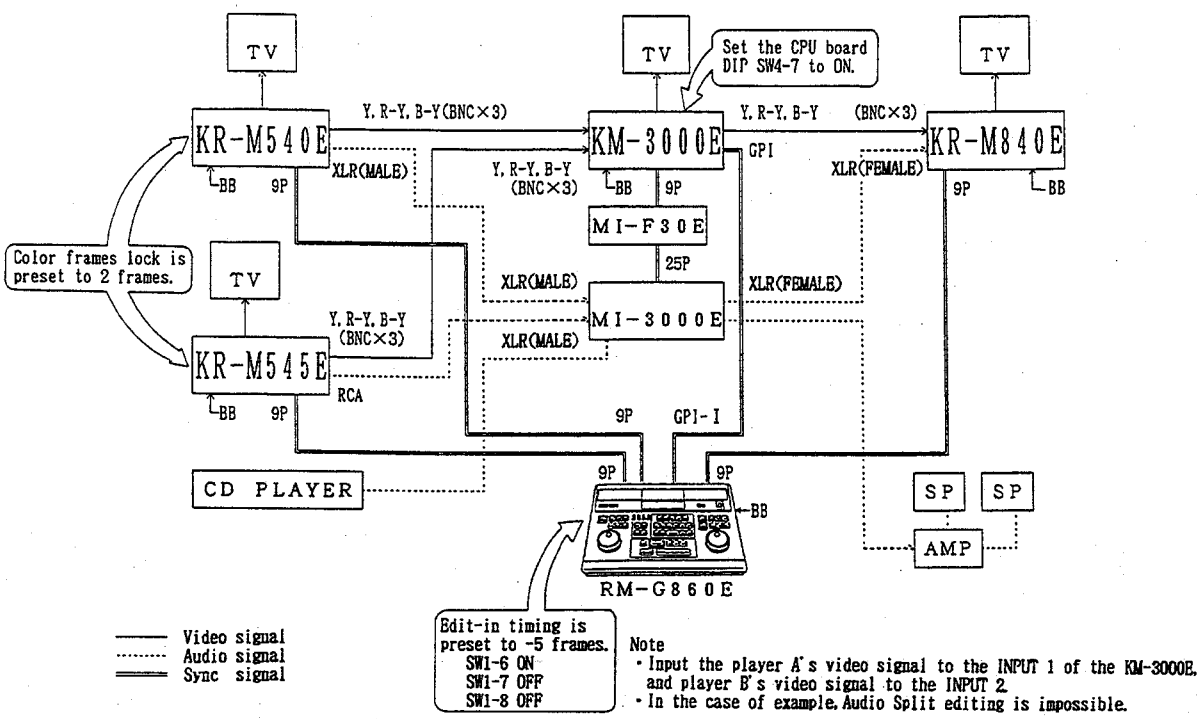


Timecode editing with S-VHS A/B roll editing system



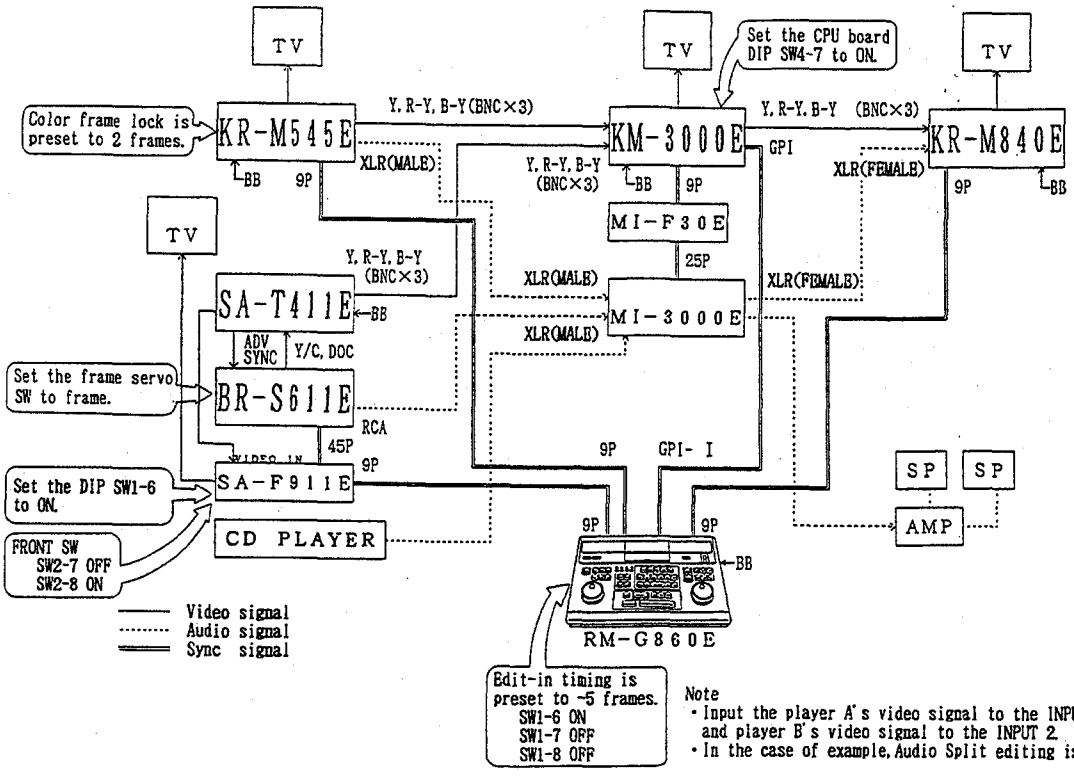
Note
• Input the player A's video signal to the INPUT 1 of the KM-D600E, and player B's video signal to the INPUT 2.
• GPI connection of MI-F30E activates only the EFFECT TAKE.

MII A/B roll editing system



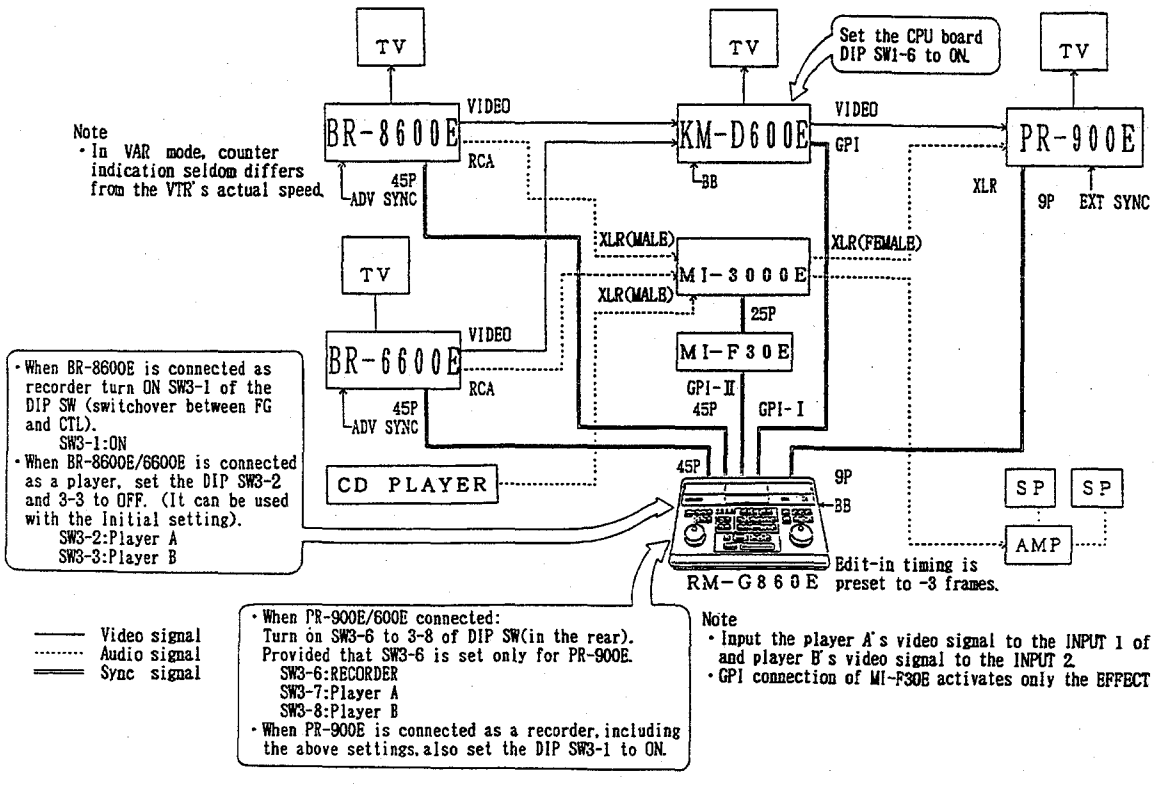
Note
• Input the player A's video signal to the INPUT 1 of the KM-3000E, and player B's video signal to the INPUT 2.
• In the case of example, Audio Split editing is impossible.

S-VHS • MII A/B roll editing system



Note
- Input the player A's video signal to the INPUT 1 of the KM-3000E, and player B's video signal to the INPUT 2.
- In the case of example, Audio Split editing is impossible.

3/4, VHS A/B roll editing system



Note
- Input the player A's video signal to the INPUT 1 of the KM-D600E, and player B's video signal to the INPUT 2.
- GPI connection of MI-F30E activates only the EFFECT TAKE.

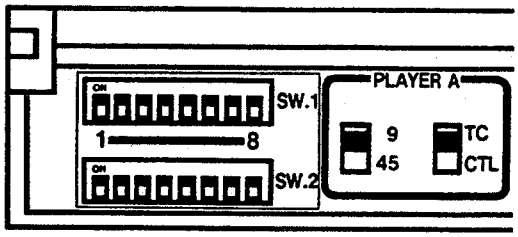
1.6 DIP SWITCHES

To change the factory preset functions of the editing system.

1. System setup DIP switches

Prior to shipment all switches are set to OFF (down).

<SYSTEM SETTING PANEL SECTION>



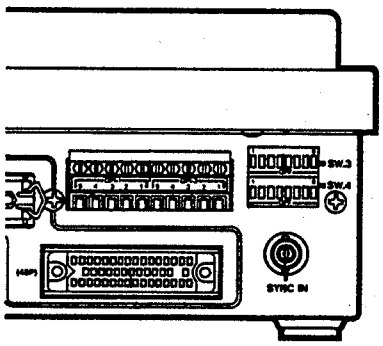
No.	Function
SW1-1	Selects the automatic retry mode when in-phase adjustment fails with the BUMP switch ON: whether the retries should be performed with changing preroll times or changing editing accuracy. SW1-1 With changing preroll times OFF When set to 7 sec: 7 ⇒ 7 ⇒ 7 ⇒ 10 ⇒ 10 ⇒ 10 When set to 10 sec: 10 ⇒ 10 ⇒ 10 When set to 15 sec: 15 ⇒ 15 ⇒ 15 With changing editing accuracy ON 4-Field CF mode: 0 frame ⇒ ±1 frame ⇒ Rough 8-Field CF mode: 0 frame ⇒ ±2 frames ⇒ Rough
SW1-2	OUT point return function ON/OFF switch in insert editing. SW1-2 OUT point return function ON OFF OUT point return function OFF ON
SW1-3	Auto REC EE function ON/OFF switch (With auto REC EE function ON, the REC EE mode is automatically cancelled when the recorder is operated manually with the REC EE switch set to ON, or the REC EE mode is automatically engaged when either player is operated.) SW1-3 Auto REC EE function OFF OFF Auto REC EE function ON ON

No.	Function
SW1-4	Not used. Keep set to OFF.
SW1-5	Switches the 10-second preroll time to 15 seconds. SW1-5 10 seconds OFF 15 seconds ON
SW1-6 SW1-7 SW1-8	To select edit-in timing in 9-pin editing. It is preset to –3 frames. SW1-6 SW1-7 SW1-8 –1 frame OFF ON OFF –2 frames OFF OFF ON –3 frames OFF OFF OFF –4 frames OFF ON ON –5 frames ON OFF OFF –6 frames ON OFF ON –7 frames ON ON OFF –8 frames ON ON ON
SW2-1	Time counter memory/Special function select switch. SW2-1 Time counter memory OFF Special function ON
SW2-2 SW2-3	To select editing accuracy. Set to "±1 frame" when the 4-field colour framing mode is selected with the KR-M840E connected. SW2-2 SW2-3 0 frame OFF OFF ±1 frame OFF ON ±2 frames ON OFF Rough ON ON
SW2-4	Determines whether or not there will be a beep when a control button is pressed. SW2-4 Beep OFF No beep ON
SW2-5	To select the colour framing mode (effective in 9-pin editing). SW2-5 2-field mode ON 4-field or 8-field mode OFF
SW2-6	To select the same-duration edit function (in which the OUT point is automatically registered as the IN point of a new edit and the OUT point of a new edit is also automatically registered with respect to that IN point so that the duration is the same as that of the previous edit.) SW2-6 Same-duration edit function OFF OFF Same-duration edit function ON ON
SW2-7	To select use of TBC when editing via the SA-F911E. SW2-7 With TBC ON Without TBC OFF
SW2-8	To defeat the auto colour frame shift function in 9-pin timecode-referenced editing SW2-8 Auto colour frame shift ON ON Auto colour frame shift OFF OFF

2. DIP switches for additional functions

Prior to shipment, all switches are set to OFF (down).

<REAR PANEL>



No.	Function
SW3-1	Selects between CTL and FG signals as the recorder's time counting reference. SW3-1 CTL signal OFF (Set to ON when using the FG signal ON the PR-900E.)
SW3-2	Selects between CTL and FG signals as player A's time counting reference. SW3-2 CTL signal OFF (Keep set to OFF.) FG signal ON
SW3-3	Selects between CTL and FG signals as player B's time counting reference. SW3-3 CTL signal OFF (Keep set to OFF.) FG signal ON
SW3-4	Not used. Keep set to OFF.
SW3-5	Set to ON when using the KR-M800E as the recorder.
SW3-6	Set to ON when using the PR-900E as the recorder.
SW3-7	Set to ON when using the KR-M800E/PR-900E/PR-600E as player A.
SW3-8	Set to ON when using the KR-M800E/PR-900E/PR-600E as player B.

No.	Function
SW4-1	Selects video circuitry according to connected equipment. SW4-1 With KM-D600E, KM-3000E OFF With SA-W700E ON
SW4-2	To select the postroll time (playback time after the edit-out point in preview and review). SW4-2 5 sec OFF 1 sec ON
SW4-3	Selects between 4-field and 8-field colour framing modes when system setting panel DIP switch SW2-5 is set to OFF. SW4-3 4-field mode OFF 8-field mode ON
SW4-4	Selects audio circuitry according to connected equipment. SW4-4 With all equipment except SA-W700E OFF With SA-W700E ON
SW4-5/6/7	To select edit-in timing in 45-pin editing. It is preset to –2 frames. SW4-5 SW4-6 SW4-7 –1 frame ON OFF OFF –2 frames OFF OFF OFF (for BR-S811E/BR-S810E) –3 frames OFF ON OFF (for KR-M800E/KR-M820E/PR-900E) –4 frames ON ON OFF –5 frames OFF OFF ON (for KR-M840E with SA-K22E) –6 frames ON OFF ON –7 frames OFF ON ON –8 frames ON ON ON
SW4-8	Selects the time tracking function. (With the time tracking function ON, if the recorder's IN point automatically registered at the OUT point of the previous edit is shifted, the player's IN point is also shifted accordingly.) SW4-8 Time tracking function OFF OFF Time tracking function ON ON

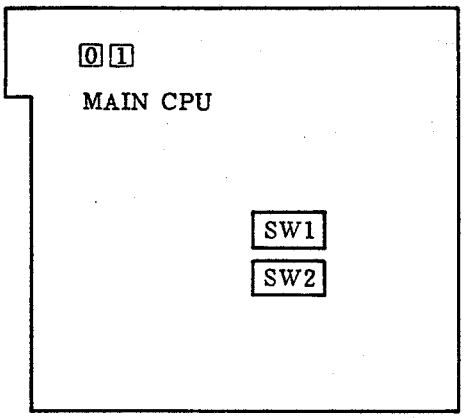
NOTE:

- SW3-5/6/7/8 must be set to OFF when not using the KR-M800E/PR-900E/PR-600E.

3. INTERNAL DIP SWITCHES (MAIN CPU BOARD)

Prior to shipment, all switches are set to off (down).

<MAIN CPU BOARD>



No.	Function
SW1-1 SW1-2 SW1-3	To select 45-pin edit-in timing. -2 frames: SW1-1 OFF, SW1-2 OFF, SW1-3 OFF -3 frames: SW1-1 ON, SW1-2 OFF, SW1-3 OFF -4 frames: SW1-1 OFF, SW1-2 ON, SW1-3 OFF -5 frames: SW1-1 ON, SW1-2 ON, SW1-3 OFF -6 frames: SW1-1 OFF, SW1-2 OFF, SW1-3 ON -7 frames: SW1-1 ON, SW1-2 OFF, SW1-3 ON -8 frames: SW1-1 OFF, SW1-2 ON, SW1-3 ON -9 frames: SW1-1 ON, SW1-2 ON, SW1-3 ON
SW1-4 ∫ SW1-8	Not used
SW2-1 ∫ SW2-8	Not used

1.7 HOW TO CHECK THE P-ROM (IC49) VERSION AND LED DISPLAY

1. Chang the Dip-switch of 1-4 to ON. The switch is located under the panel.

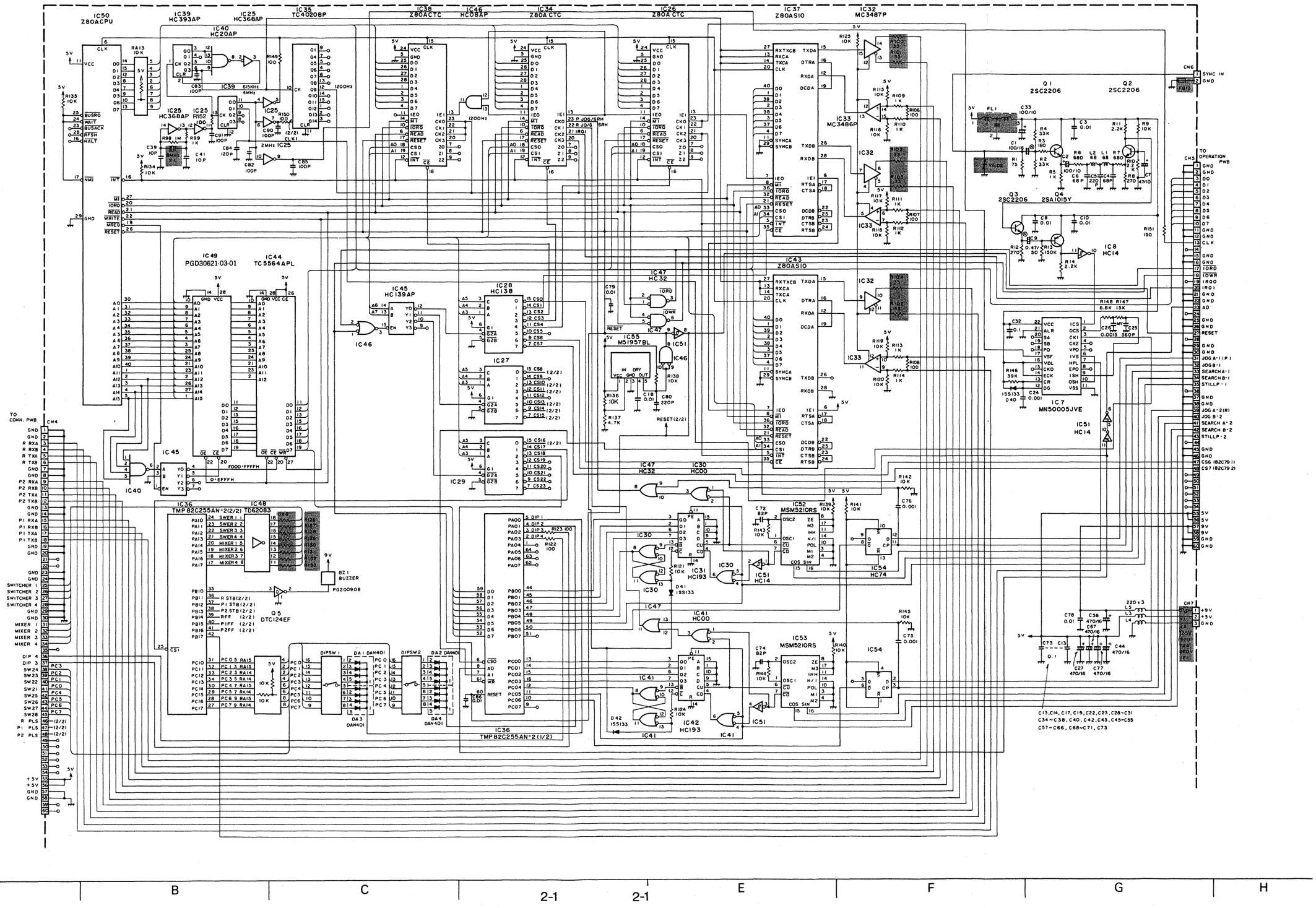
2. Press [TOTAL] located top right and [SEARCH] buttons of recorder side, then the display of A-player shows 0 0 . 0 3 . 0 0 . 0 1 that means version 03-01.
   To clear the indication press [SHIFT] and [ALL STOP] .

3. To check display indication, press three of [SHIFT] + [ALL STOP] + [TOTAL] buttons simultaneously, all LEDs start counting.
   By pressing [ALL STOP] , it's cleared.

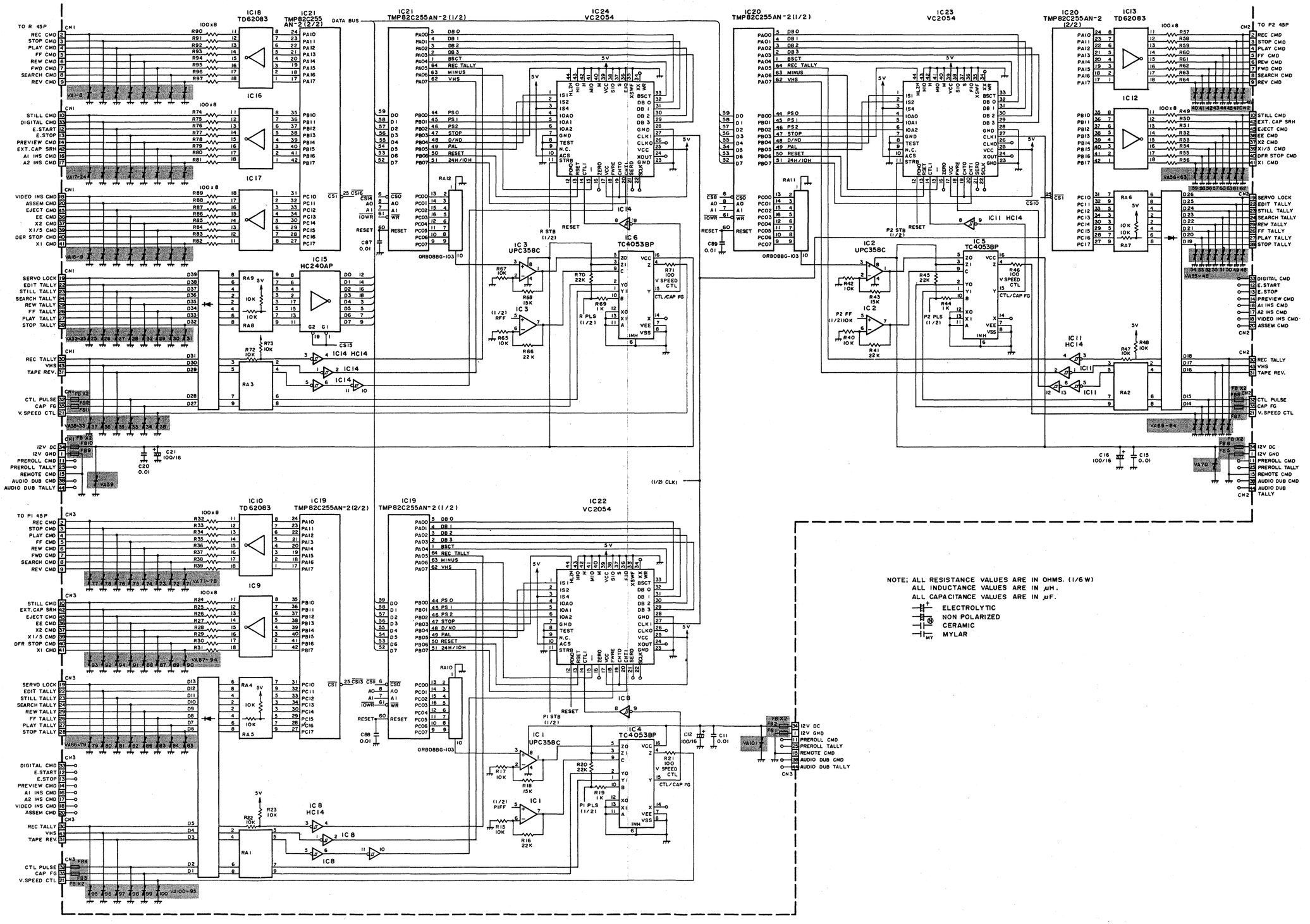
4. After the check, back to the Dip-SW 1-4 to OFF otherwise no functioning.

SECTION 2
DIAGRAMS AND CIRCUIT BOARD

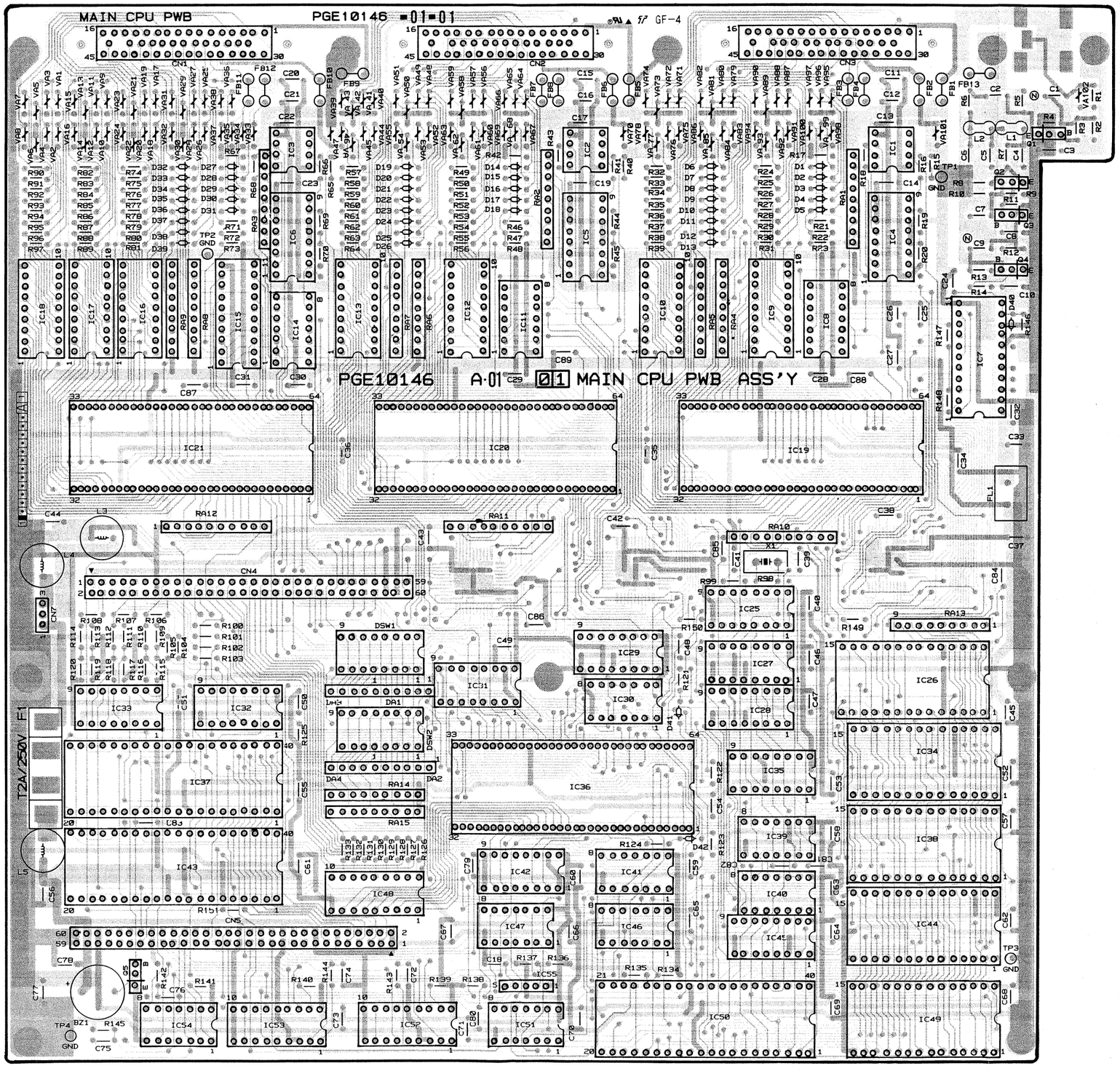
2.1 MAIN CPU SCHEMATIC DIAGRAM (1/2)



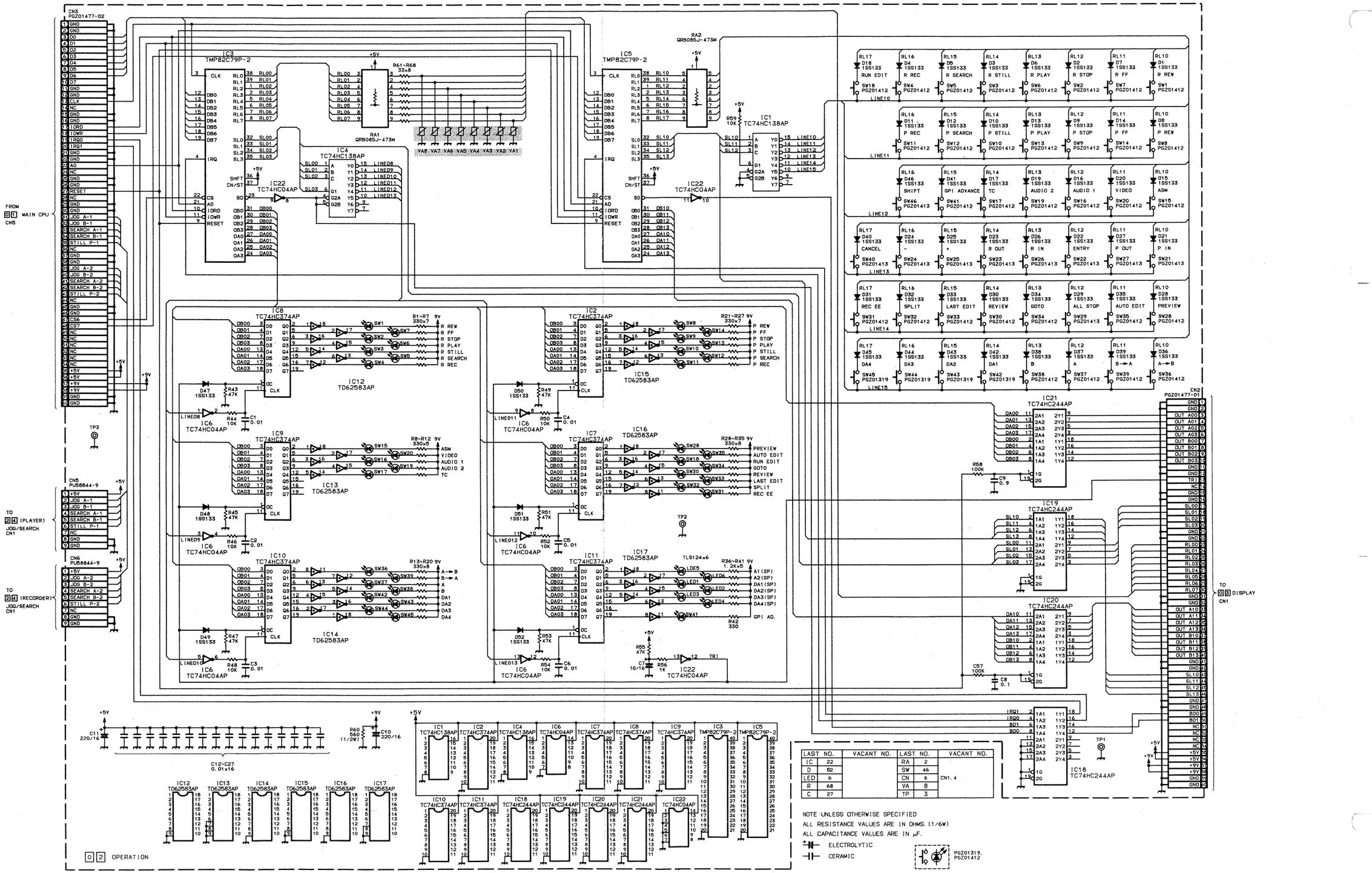
MAIN CPU SCHEMATIC DIAGRAM (2/2)



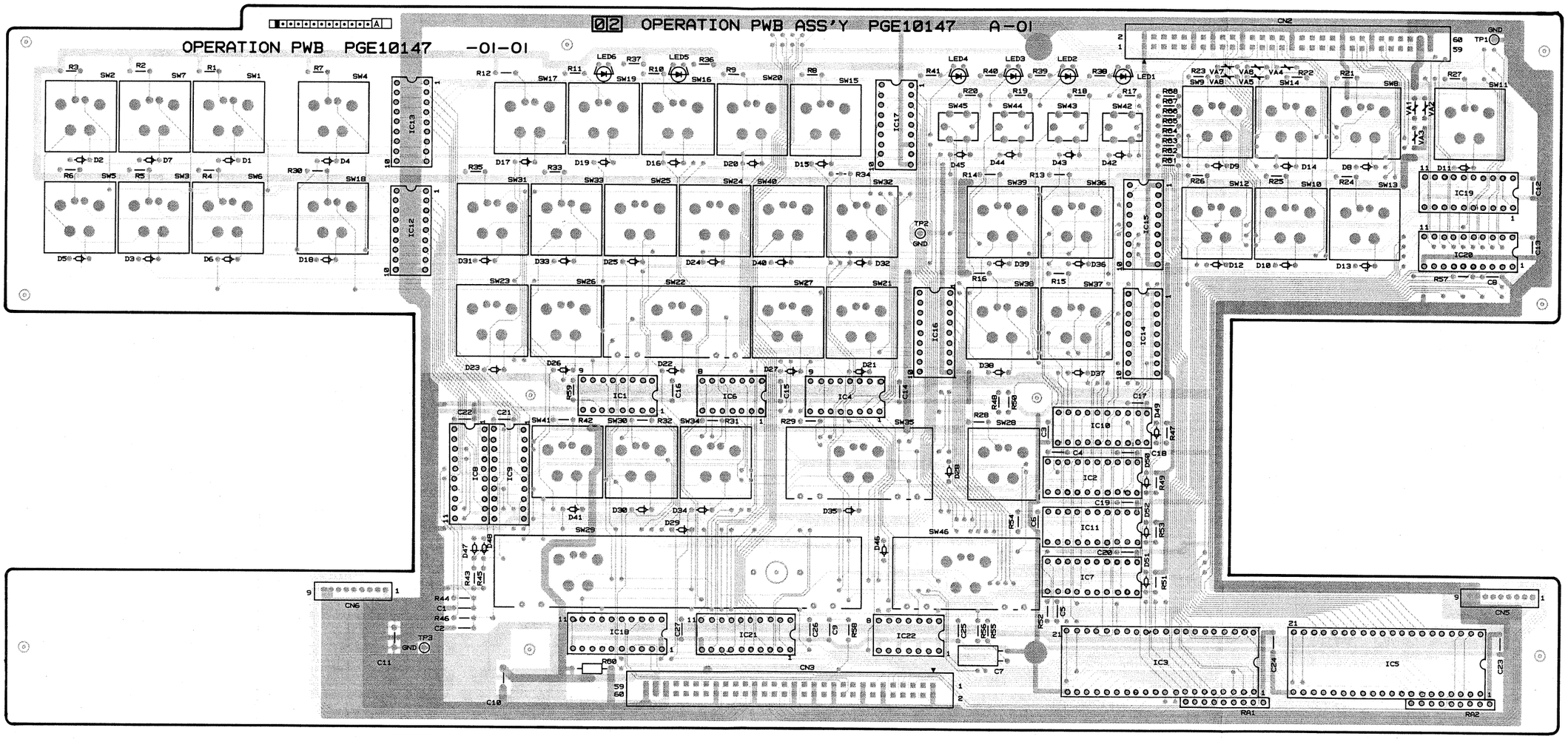
2.2 MAIN CPU CIRCUIT BOARD



2.3 OPERATION SCHEMATIC DIAGRAM



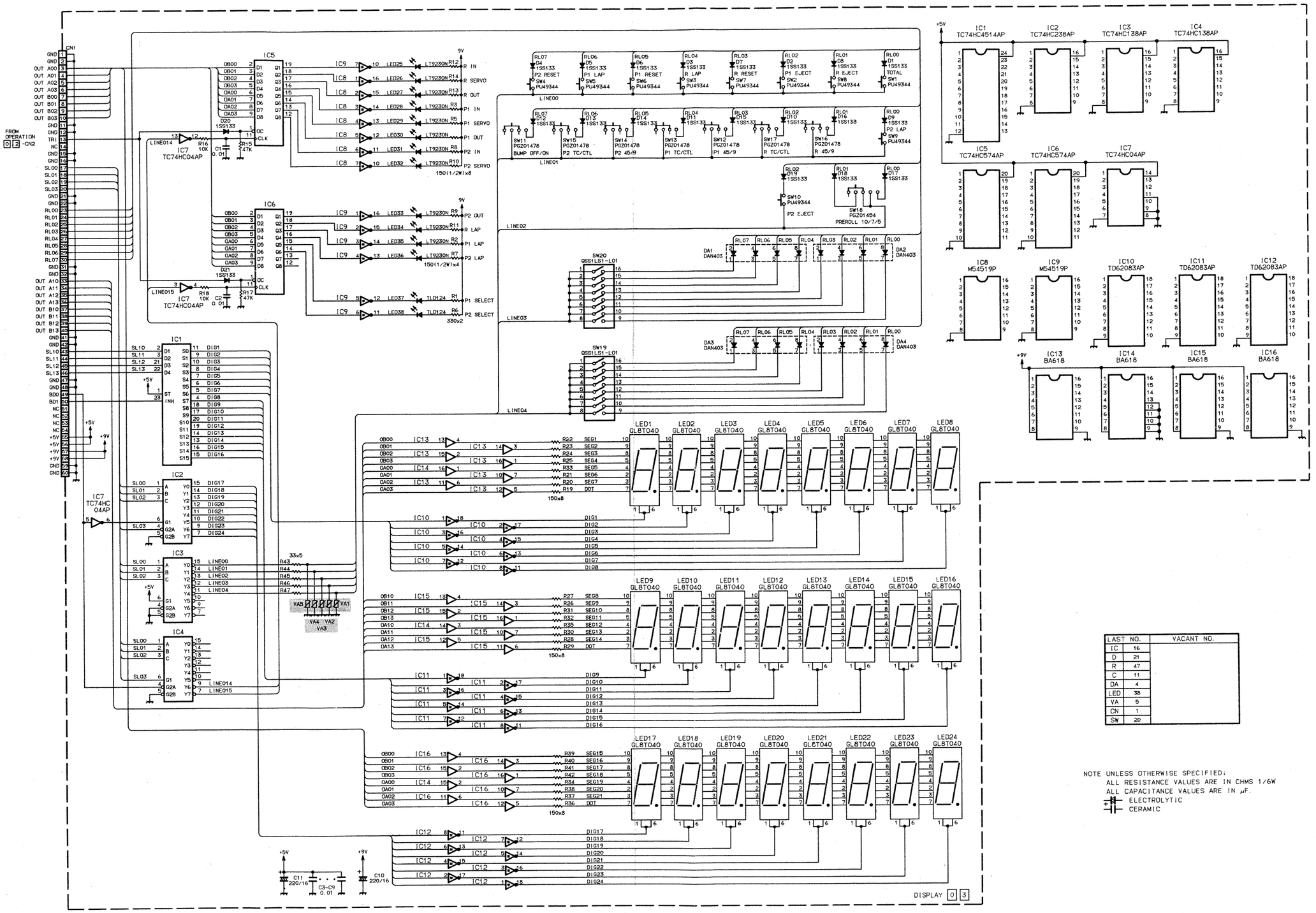
2.4 OPERATION CIRCUIT BOARD



A B C 2-5 2-5 E F G H

1 2 3 4 5 6

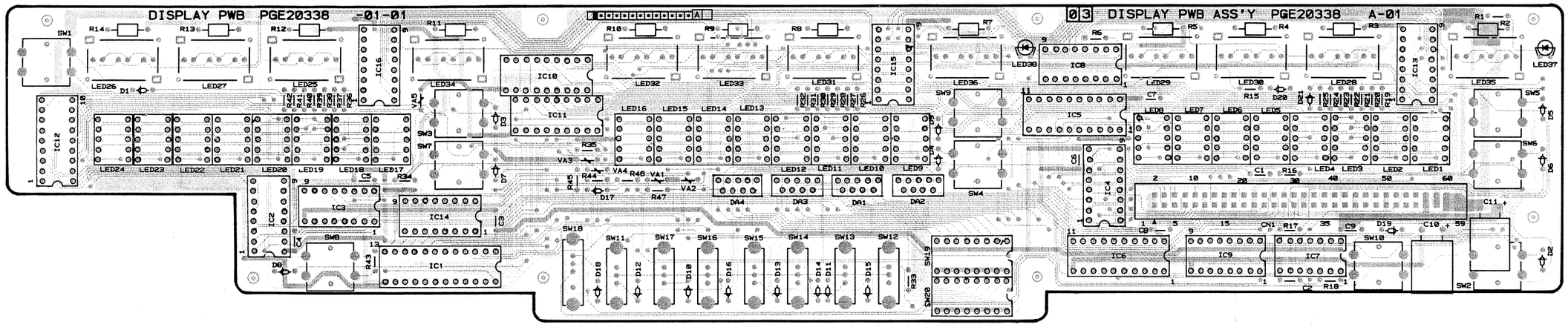
2.5 DISPLAY SCHEMATIC DIAGRAM



LAST NO.	VACANT NO.
IC	16
D	21
R	47
C	11
DA	4
LED	38
VA	5
CN	1
SW	20

NOTE UNLESS OTHERWISE SPECIFIED;
ALL RESISTANCE VALUES ARE IN OHMS 1/6W
ALL CAPACITANCE VALUES ARE IN μF.
ELECTROLYTIC
CERAMIC

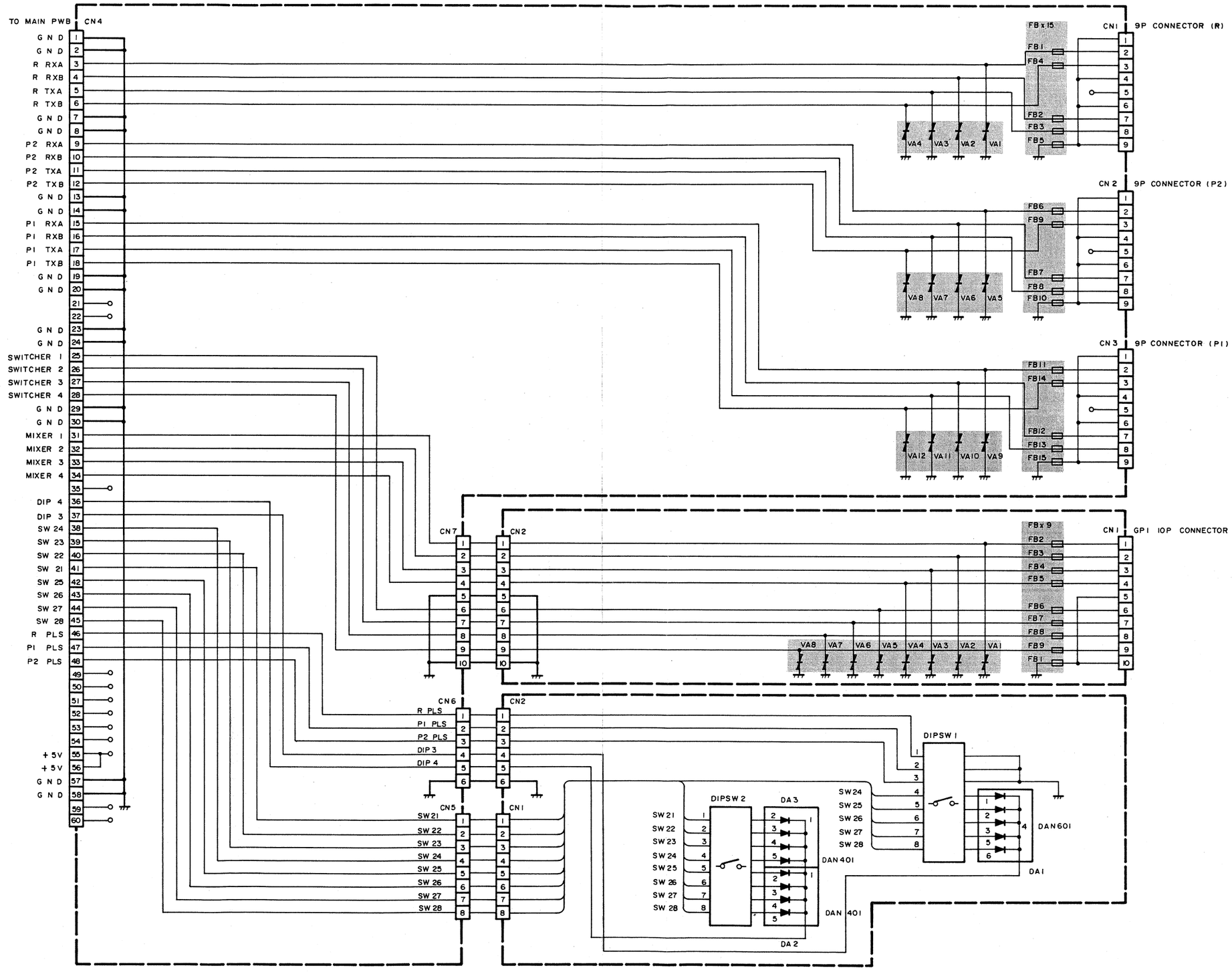
2.6 DISPLAY CIRCUIT BOARD



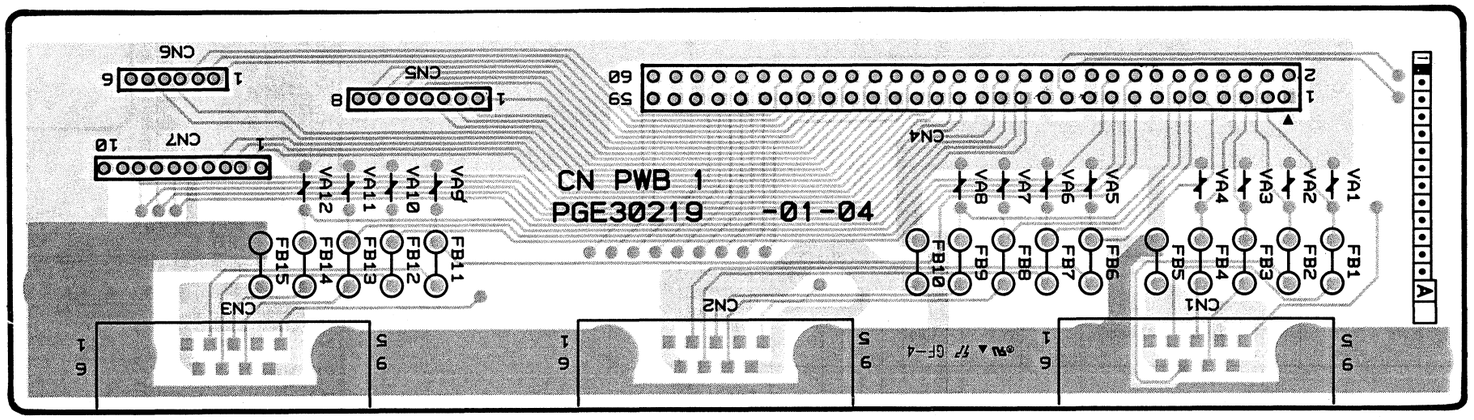
A | B | C | 2-7 | 2-7 | E | F | G | H

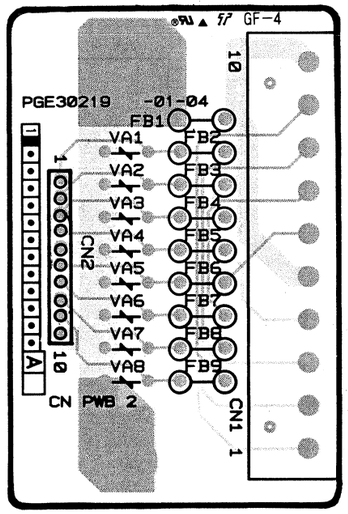
1 2 3 4 5 6

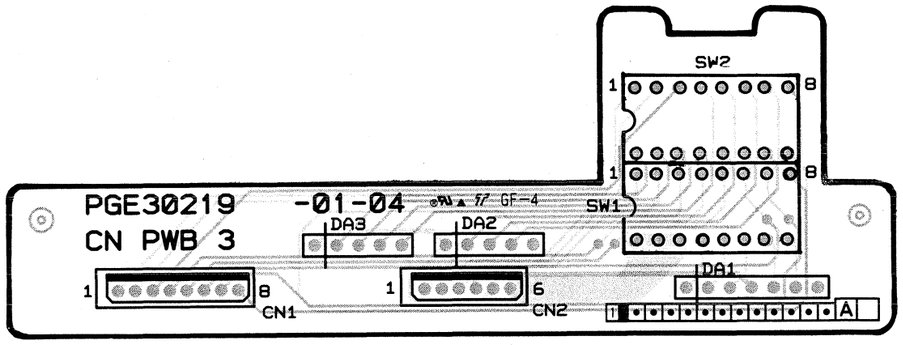
2.7 CONNECTOR SCHEMATIC DIAGRAM



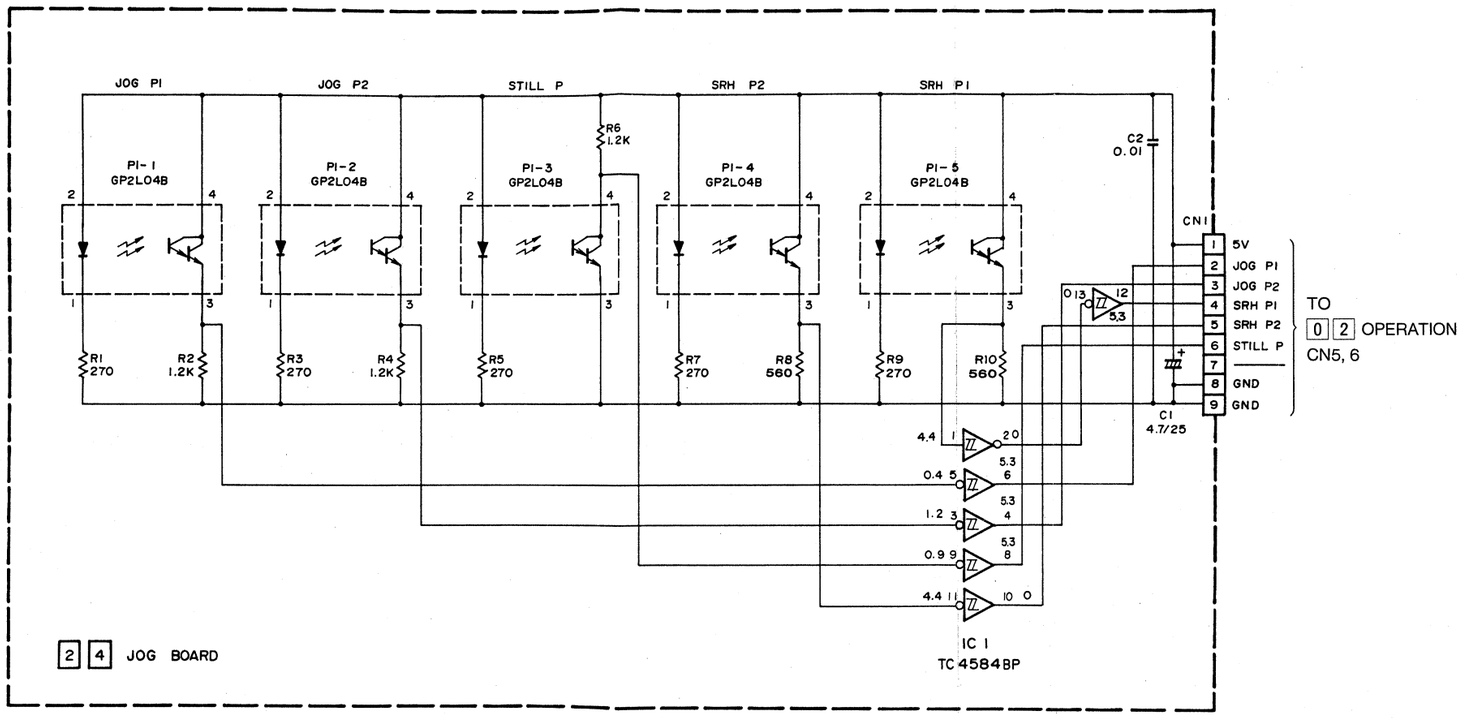
2.8 CONNECTOR CIRCUIT BOARD



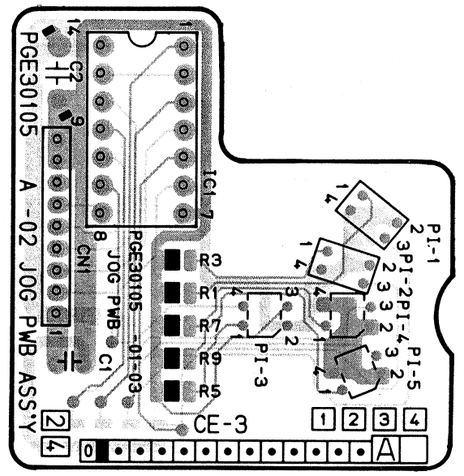




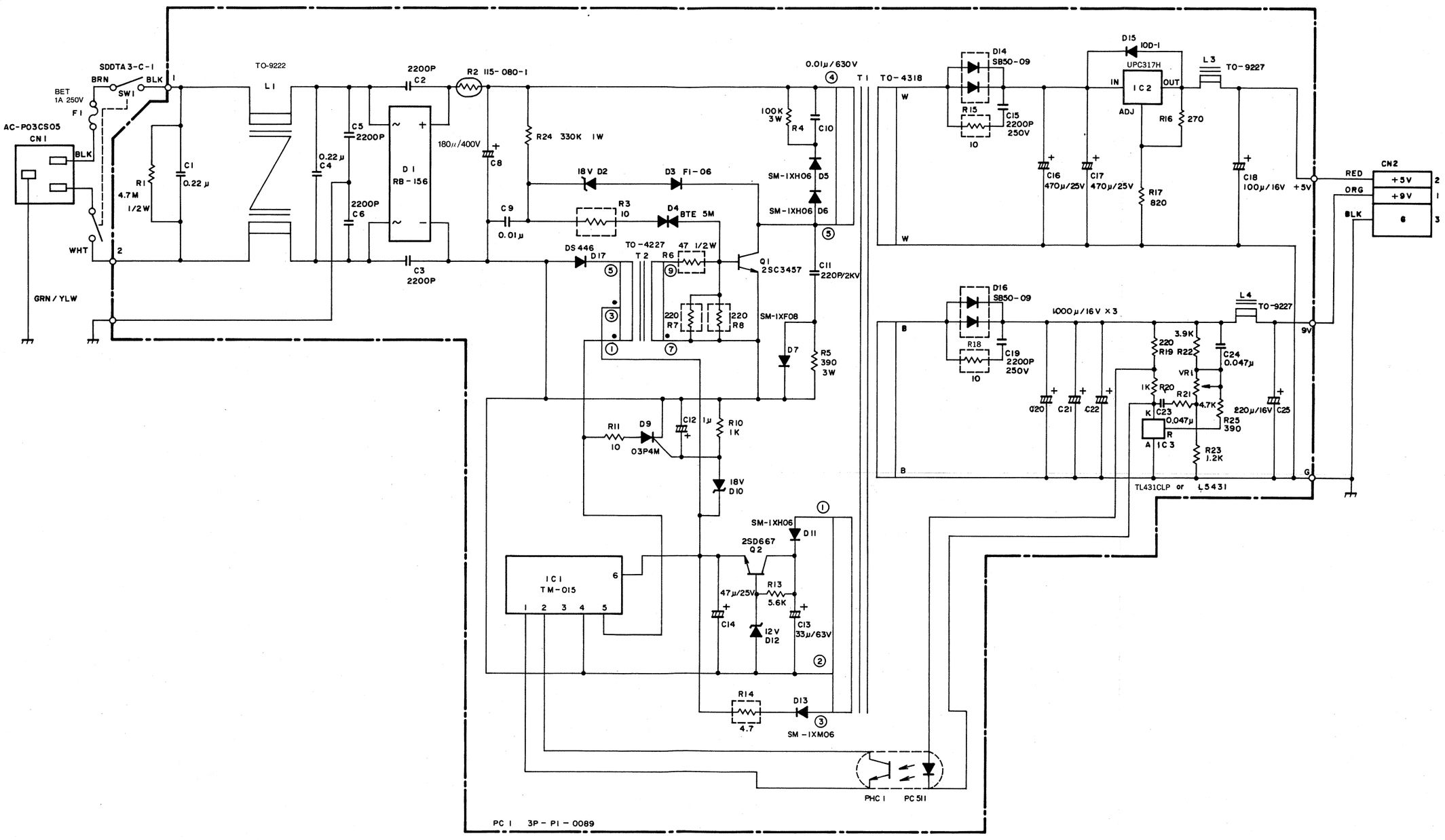
2.9 JOG SCHEMATIC DIAGRAM



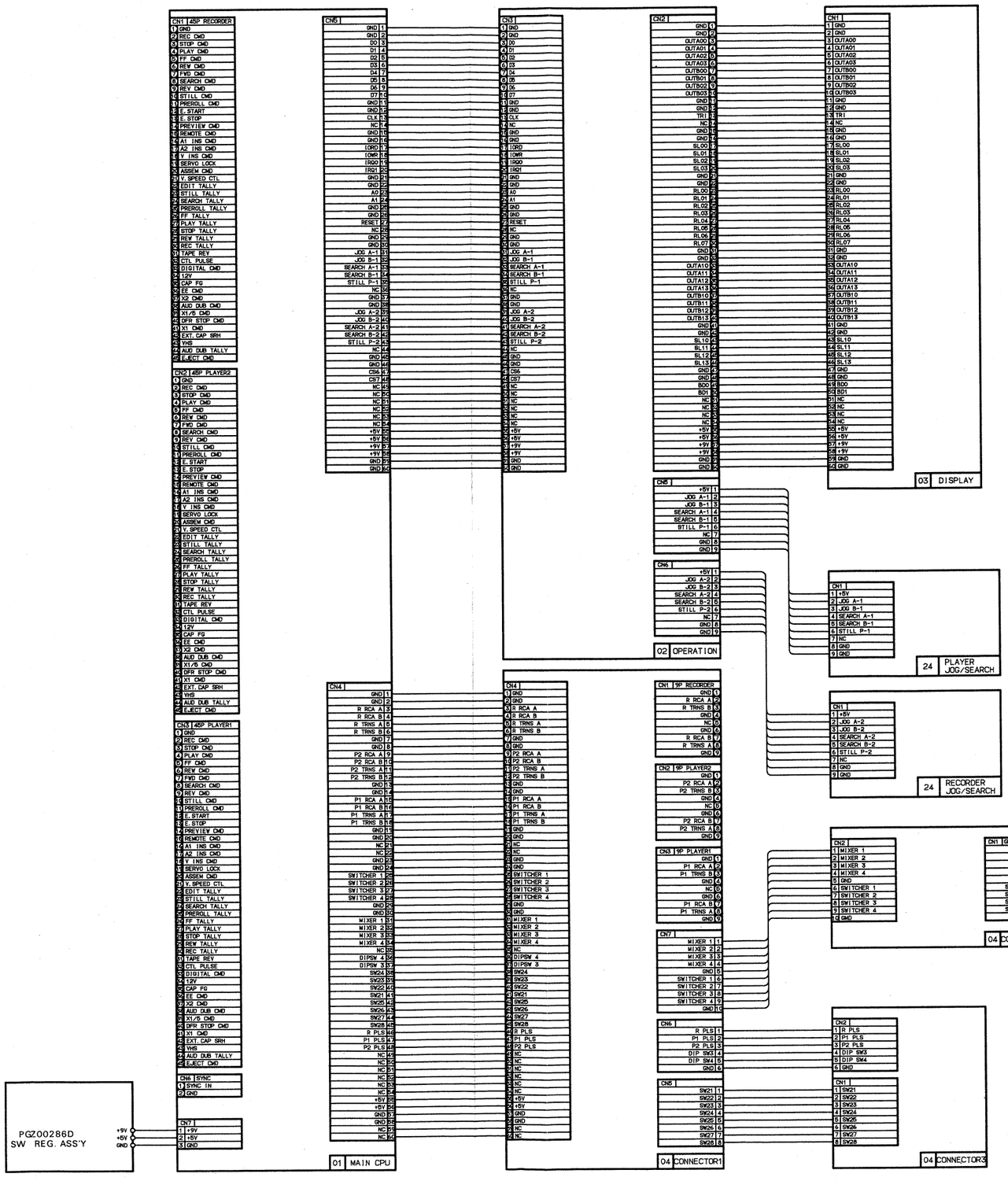
2.10 JOG CIRCUIT BOARD



2.11 SWITCHING REGURATOR ASS'Y SCHEMATIC DIAGRAM

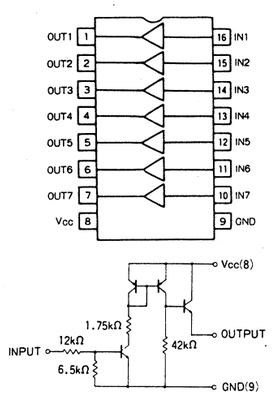


2.12 OVERALL WIRING DIAGRAM

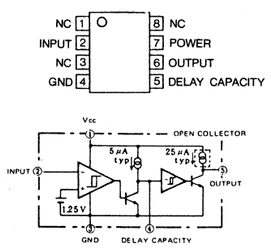


2.13 IC BLOCK DIAGRAMS

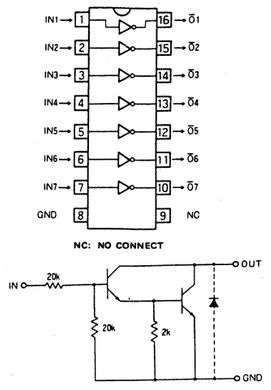
— BA618 —
LED Driver



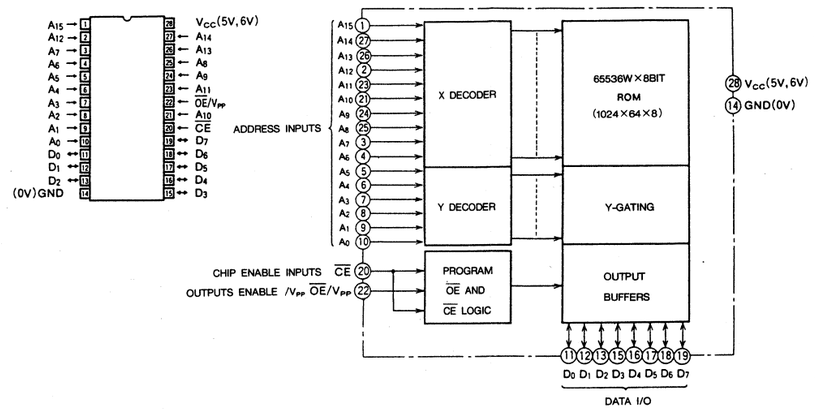
— M51957BL —
Voltage Detector/System Reset



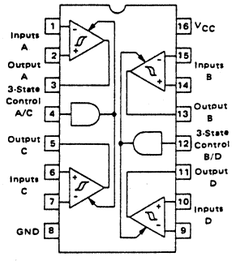
— M54519P —
7-Unit 400 mA Darlington Transistor Array



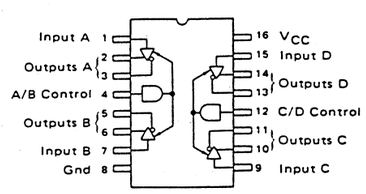
— PGD30621-03-01 — (M5L27512K)
524288-Bit (65536-Word by 8-bit) EPROM



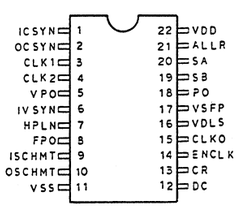
— MC3486P —
Quad RS-422/423 Line Receiver



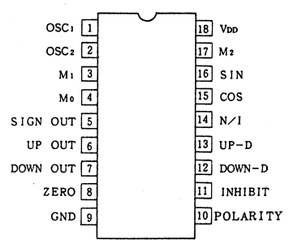
— MC3487P —
Quad RS-422 Line Driver (3-State)



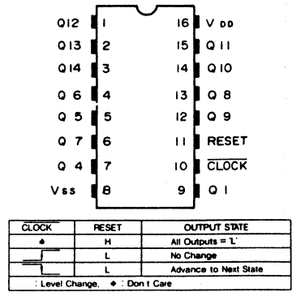
— MN50005JVE —
500 Gate CMOS Gate Array



— MSM5210RS —
Up/Down Counter



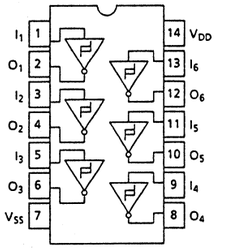
— TC4020BP —
14-Stage Ripple-Carry Binaly Counter/Dividers



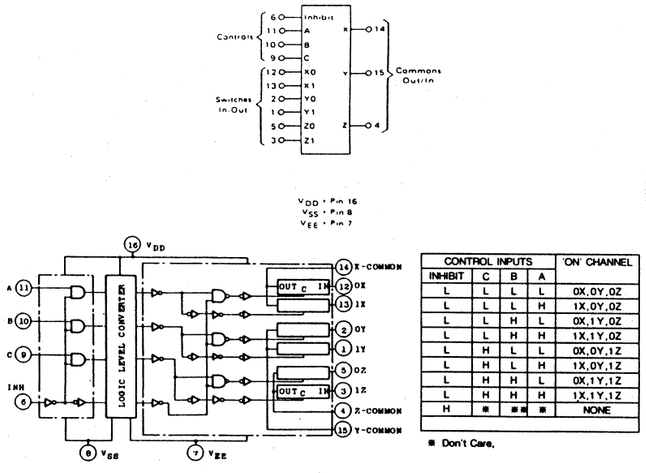
CLOCK	RESET	OUTPUT STATE
◆	H	All Outputs = 'L'
	L	No Change
	L	Advance to Next State

: Level Change, ◆ : Don't Care

— TC4584BP —
Hex Schmitt Trigger



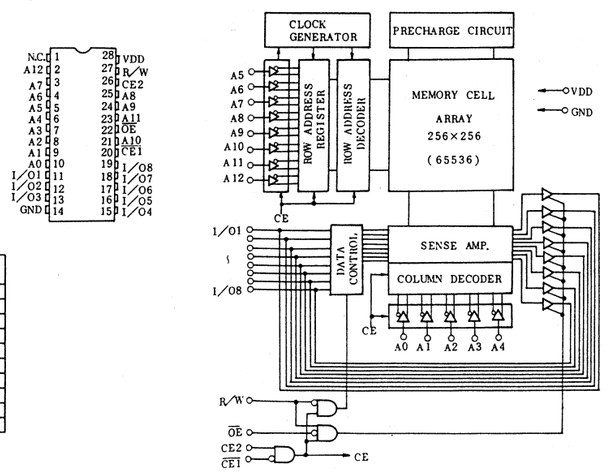
— TC4053BP —
Triple 2-Channel Analog Multiplexer/Demultiplexer



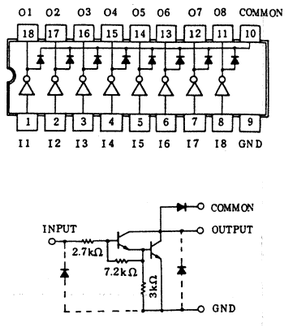
CONTROL INPUTS				'ON' CHANNEL
INHIBIT	C	B	A	
L	L	L	L	0X,0Y,0Z
L	L	L	H	1X,0Y,0Z
L	L	H	L	0X,1Y,0Z
L	L	H	H	1X,1Y,0Z
L	H	L	L	0X,0Y,1Z
L	H	L	H	1X,0Y,1Z
L	H	H	L	0X,1Y,1Z
L	H	H	H	1X,1Y,1Z
H	*	*	*	NONE

* Don't Care.

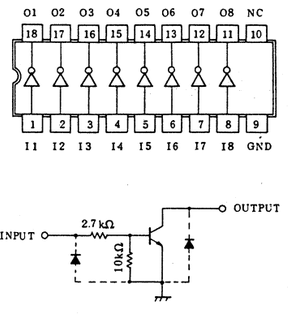
— TC5564APL-15 —
8192 Word by 8-bit CMOS



— TD62083AP —
8ch Darlington Driver



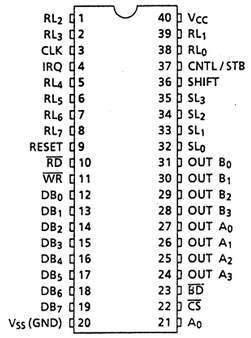
— TD62583AP —
8-single Driver

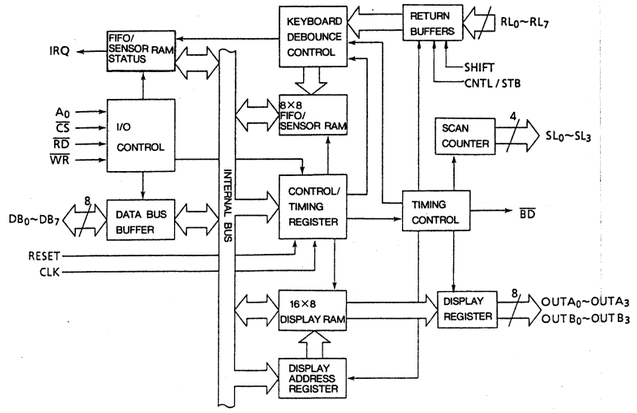


2-13

— TMP82C79P-2 —

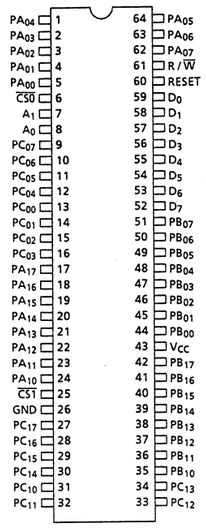
Programmable Keyboard/Display Interface

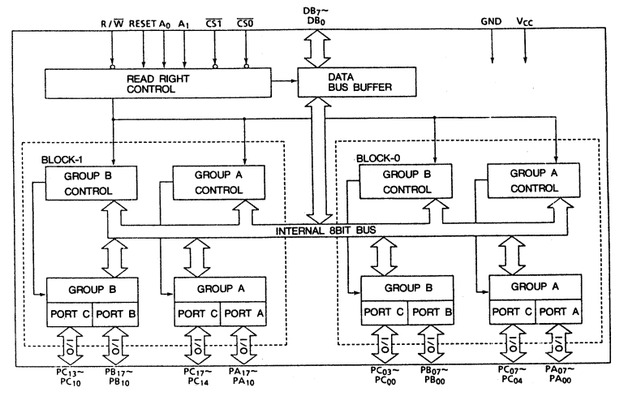




— TMP82C255AN-2 —

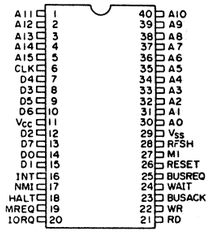
Programmable Peripheral Interface

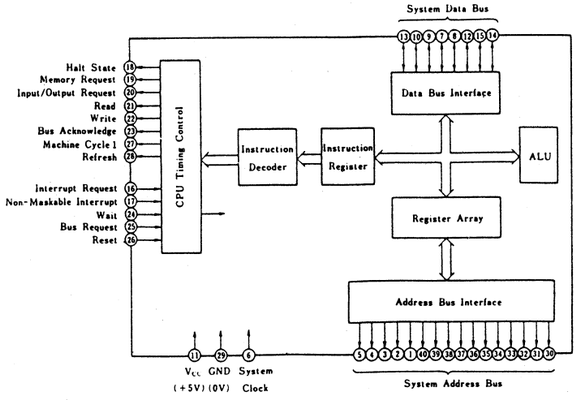




— TMPZ84C00AP-6 —

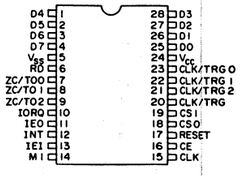
280 CPU (Central Processing Unit)

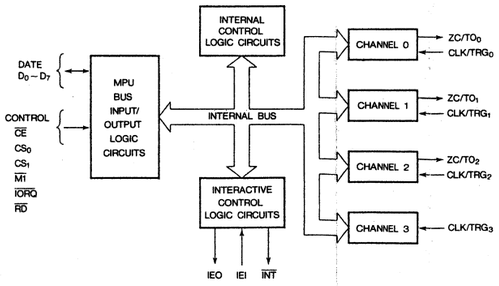




— TMPZ84C30AP-6 —

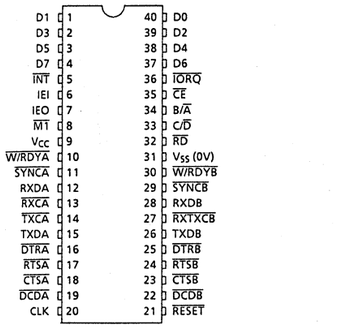
Counter Timer Circuit

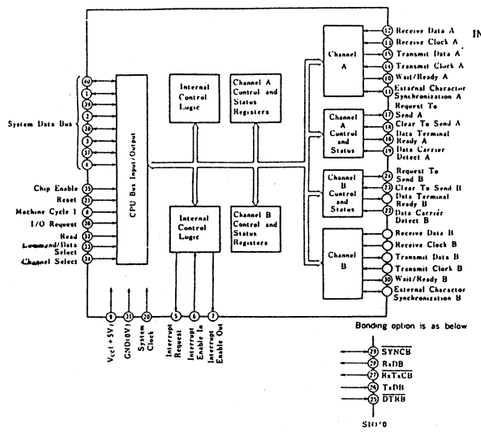




— TMPZ84C40AP-6 —

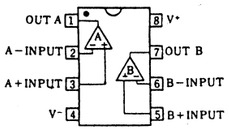
Serial I/O Controller

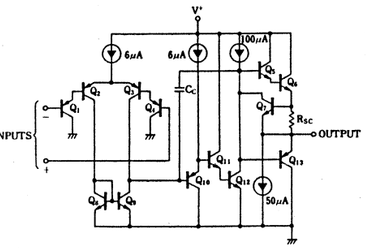




— μPC358C —

Dual Operation Amp

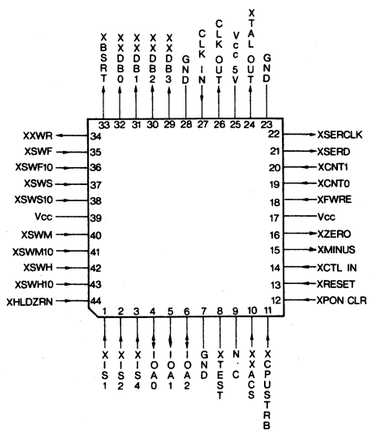




2-14

— VC2054 —

Real Time Counter



PIN NO.	IN/OUT	PIN NAME	DESCRIPTION
1. CLOCK SIGNAL			
27	I	CKIN	CLOCK IN
28	O	XCKO	CLOCK OUT
24	O	XTALO	XTAL OUT
2. SYSTEM CONTROL SIGNAL			
12	I	PCLR	POWER ON CLR
1	I	IS1	SIGNAL FORMAT SELECT S1
2	I	IS2	SIGNAL FORMAT SELECT S2
3	I	IS4	SIGNAL FORMAT SELECT S4
44	I	RUHO	RUN OR HOLD MODE SELECT IN
35	I	SWFR	FRAME PRESET SW
36	I	SWFT	10 FRAME PRESET SW
37	I	SWSC	SECOND PRESET SW
38	I	SWST	10 SECOND PRESET SW
40	I	SWMN	MINUTE PRESET SW
41	I	SWMT	10 MINUTE PRESET SW
42	I	SWHR	HOUR PRESET SW
43	I	SWHT	10 HOUR PRESET SW
19	I	CNT0	COUNTER MIDE SELECT 0
20	I	CNT1	COUNTER MIDE SELECT 1

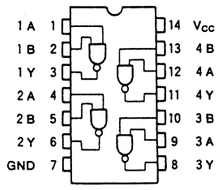
S1	S2	S4	SIGNAL NAME	SYSTEM
H	H	H	NTSC DROP FRAME	525/60
L	H	H	NTSC NON DROP FRAME	525/60
L	L	H	PAL, SECAM	625/50
L	L	L	FILM	655/48

PIN NO.	IN/OUT	PIN NAME	DESCRIPTION
			CNT0 CNT1 MODE: H H 24H COUNT; H L 10H COUNT; L L WATCH
			Specifications other than the above are not defined.
3. CTL SIGNAL			
14	I	CTLI	CTL SIGNAL IN
18	I	FRE	CTL DIRECTION SIGNAL IN
13	I	RESET	CTL RESET IN
4. DATA OUTPUT & OUTPUT CONTROL SIGNAL			
4	I, O	AD0	ADRESS DATA IN/OUT
5	I, O	AD1	
6	I, O	AD2	
10	I	XACS	ADRESS LINE OUTPUT ENABLE
32	O	XDO0	DATA OUT
31	O	XDO1	
30	O	XDO2	
29	O	XDO3	
34	O	XWR	WRITE SIGNAL OUT (NEGATIVE LOGIC)
11	I	CPURDZ	CPU READ SIGNAL IN (NEGATIVE LOGIC)
33	O	BSRT	BUSY REAL TIME COUNTER
21	O	RTSDTO	REAL TIME DATA OUT
22	O	RTSCKO	REAL TIME SERIAL CLOCK OUT
16	O	ZFLG	ZERO FLAG OUT
15	O	MFLG	MINUS FLAG OUT

74 Families of Compatible TTL Circuits

— TC74HC00AP —

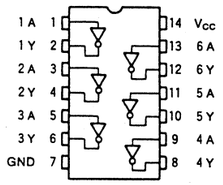
Quad 2-Input NAND Gate



A	B	Y
L	L	H
L	H	H
H	L	H
H	H	L

— TC74HC04AP —

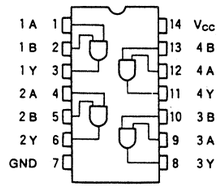
Hex Inverter



A	Y
L	H
H	L

— TC74HC08AP —

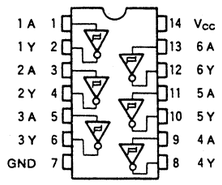
Quad 2-Input AND Gate



A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

— TC74HC14AP —

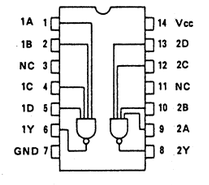
Hex Schmitt Inverter



A	Y
L	H
H	L

— TC74HC20AP —

Dual 4-Input NAND Gate

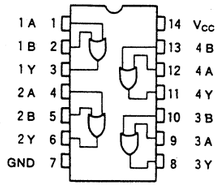


A	B	C	D	Y
L	X	X	X	H
X	L	X	X	H
X	X	L	X	H
X	X	X	L	H
H	H	H	H	L

X : Don't Care

— TC74HC32AP —

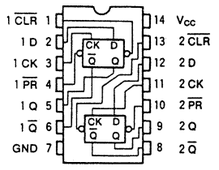
Quad 2-Input OR Gate

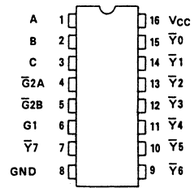


A	B	Y
H	H	H
L	H	H
H	L	H
L	L	L

— TC74HC74AP —

Dual D-Type Flip Flop with Preset and Clear





INPUTS				OUTPUTS		FUNCTION
CLR	PR	D	CK	Q	Q	
L	H	X	X	L	H	CLEAR
H	L	X	X	H	L	PRESET
L	L	X	X	H	H	—
H	H	L	↓	L	H	—
H	H	H	↓	H	L	—
H	H	X	↑	Q_n	$\overline{Q}_n$	NO CHANGE

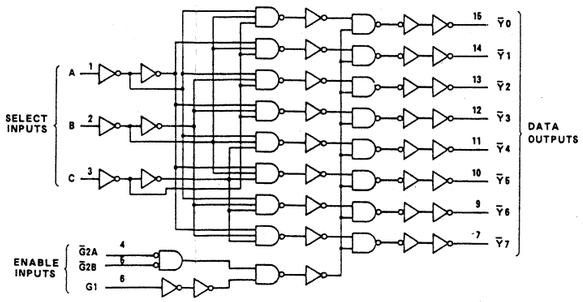
X : Don't care

— TC74HC138AP —

3-to-8 Line Decoder

INPUTS						OUTPUTS								SELECTED OUTPUT
ENABLE			SELECT											
G1	G2A	G2B	C	B	A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	
L	X	X	X	X	X	H	H	H	H	H	H	H	H	NONE
X	H	X	X	X	X	H	H	H	H	H	H	H	H	NONE
X	X	H	X	X	X	H	H	H	H	H	H	H	H	NONE
H	L	L	L	L	L	L	H	H	H	H	H	H	H	$\overline{Y}0$
H	L	L	L	L	H	H	L	H	H	H	H	H	H	$\overline{Y}1$
H	L	L	L	H	L	H	H	L	H	H	H	H	H	$\overline{Y}2$
H	L	L	L	H	H	H	H	H	L	H	H	H	H	$\overline{Y}3$
H	L	L	H	L	L	H	H	H	H	L	H	H	H	$\overline{Y}4$
H	L	L	H	L	H	H	H	H	H	H	L	H	H	$\overline{Y}5$
H	L	L	H	H	L	H	H	H	H	H	H	L	H	$\overline{Y}6$
H	L	L	H	H	H	H	H	H	H	H	H	H	L	$\overline{Y}7$

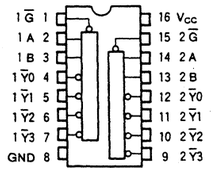
X:Don't care



2-15

— TC74HC139AP —

Dual 2-to-4 Line Decoder

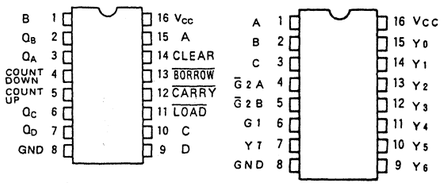


INPUTS			OUTPUTS				SELECTED OUTPUT
ENABLE $\overline{G}$	SELECT B	SELECT A	$\overline{Y0}$	$\overline{Y1}$	$\overline{Y2}$	$\overline{Y3}$	
H	X	X	H	H	H	H	NONE
L	L	L	L	H	H	H	$\overline{Y0}$
L	L	H	H	L	H	H	$\overline{Y1}$
L	H	L	H	H	L	H	$\overline{Y2}$
L	H	H	H	H	H	L	$\overline{Y3}$

X : Don't care

— TC74HC193AP —

Synchronous Up/Down Binary Counter



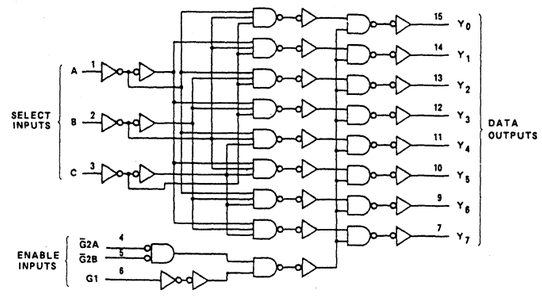
INPUTS					FUNCTION
COUNT UP	COUNT DOWN	$\overline{LOAD}$	CLEAR		
↑	H	H	L		COUNT UP
↓	H	H	L		NO COUNT
H	↑	H	L		COUNT DOWN
H	↓	H	L		NO COUNT
X	X	L	L		PRESET
X	X	X	H		RESET

— TC74HC238AP —

3-to-8 Line Decoder

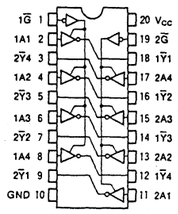
INPUTS						OUTPUTS								SELECTED OUTPUT
ENABLE G1	ENABLE $\overline{G2A}$	ENABLE $\overline{G2B}$	SELECT C	SELECT B	SELECT A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	
L	X	X	X	X	X	L	L	L	L	L	L	L	L	NONE
X	H	X	X	X	X	L	L	L	L	L	L	L	L	NONE
X	X	H	X	X	X	L	L	L	L	L	L	L	L	NONE
H	L	L	L	L	L	H	L	L	L	L	L	L	L	Y0
H	L	L	L	L	H	L	H	L	L	L	L	L	L	Y1
H	L	L	L	H	L	L	L	H	L	L	L	L	L	Y2
H	L	L	L	H	H	L	L	L	H	L	L	L	L	Y3
H	L	L	H	L	L	L	L	L	L	H	L	L	L	Y4
H	L	L	H	L	H	L	L	L	L	L	H	L	L	Y5
H	L	L	H	H	L	L	L	L	L	L	L	H	L	Y6
H	L	L	H	H	H	L	L	L	L	L	L	L	H	Y7

X:Don't care



— TC74HC240AP —

Octal Bus Buffer (3-State)

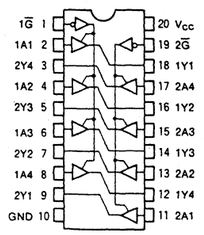


INPUTS		OUTPUTS
$\overline{G}$	A_n	$\overline{Y}_n$
L	L	H
L	H	L
H	X	Z

X : Don't Care
Z : High Impedance

— TC74HC244AP —

Octal Bus Buffer (3-State)

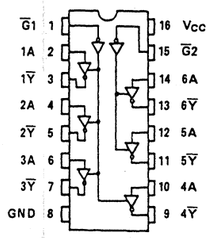


INPUTS		OUTPUTS
$\overline{G}$	A_n	Y_n
L	L	L
L	H	H
H	X	Z

X : Don't Care
Z : High Impedance

— TC74HC368AP —

Hex Bus Buffer (3-State/Inverted)

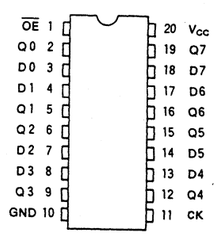


INPUTS		OUTPUTS
$\overline{G}$	An	$\overline{Y}$
L	L	H
L	H	L
H	X	Z

X : Don't Care
Z : High Impedance

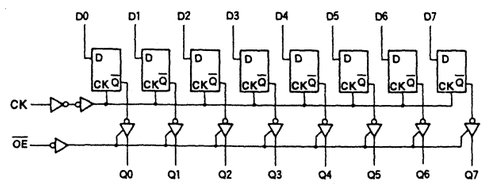
— TC74HC374AP —

Octal D-type Flip-Flop (3-State)



INPUTS			OUTPUTS
$\overline{OE}$	CK	D	Q
H	X	X	Z
L	↑	X	Q_n
L	↑	L	L
L	↑	H	H

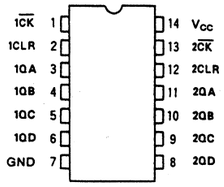
X : Don't Care
Z : High Impedance
Q_n : No change



2-16

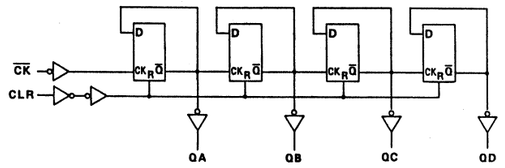
— TC74HC393AP —

Dual Binary Counter



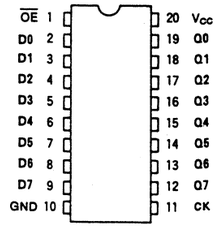
INPUT		OUTPUT			
$\overline{CK}$	CLR	QA	QB	QC	QD
X	H	L	L	L	L
↓	L	COUNT UP			
↑	L	NO CHANGE			

X:Don't Care



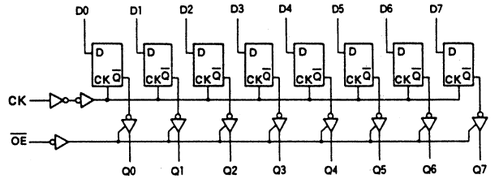
— TC74HC574AP —

Octal D-Type Flip-Flop (3-State)



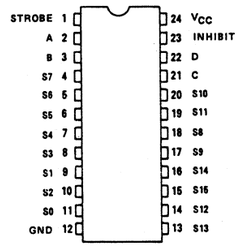
INPUTS			OUTPUTS
$\overline{OE}$	CK	D	Q
H	X	X	Z
L	↓	X	Q_n
L	↑	L	L
L	↑	H	H

X : Don't Care
Z : High Impedance
Q_n : No change



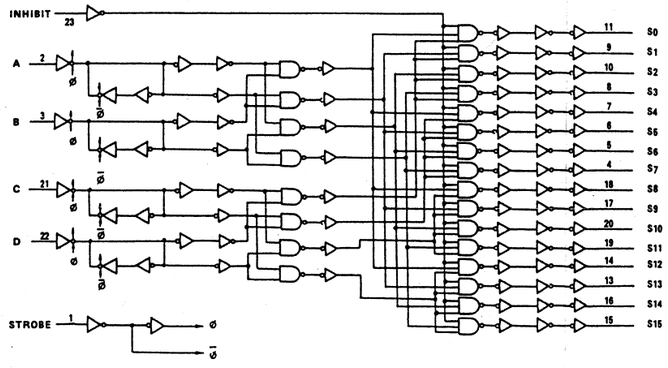
— TC74HC4514AP —

4-to-16 Line Decoder/Latch (Inverted)



INPUTS					OUTPUTS
INHIBIT	A	B	C	D	"H"
L	L	L	L	L	S_0
L	H	L	L	L	S_1
L	L	H	L	L	S_2
L	H	H	L	L	S_3
L	L	L	H	L	S_4
L	H	L	H	L	S_5
L	L	H	H	L	S_6
L	H	H	H	L	S_7
L	L	L	L	H	S_8
L	H	L	L	H	S_9
L	L	H	L	H	S_{10}
L	H	H	L	H	S_{11}
L	L	L	H	H	S_{12}
L	H	L	H	H	S_{13}
L	L	H	H	H	S_{14}
L	H	H	H	H	S_{15}
H	*	*	*	*	ALL OUTPUTS"L"

* :Don't Care



2-17

SECTION 3
EXPLODED VIEWS AND PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

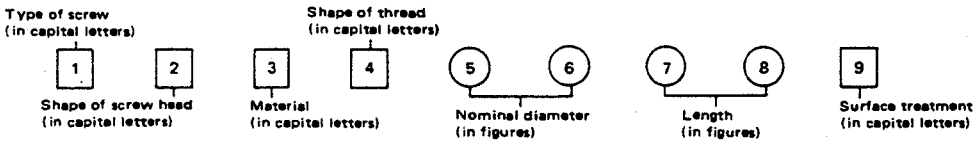
NOTE:

- [M] indicates mechanical symbol number.
- "X" indicates quantity per set.

3.1 STANDARD PART NUMBER CODING

3.1.1 Screw coding

Standard screw part numbers are as follows.



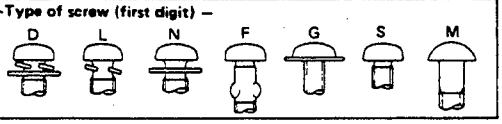
Type of screw (first digit)

- S Normal screws
- D Assembled machine screws (with plain and spring washers)
- L " (with spring washer)
- N " (with plain washer)
- F Feather screws
- G Washer head tapping screws
- M Wood screws

Shape of screw head (second digit)

- B Brazier head
- D Binding head
- H Oval countersunk head
- P Pan head
- R Round head
- S Flat head
- T Truss head
- W Washer head (machine screws)
- X Toothed head

– Type of screw (first digit) –



– Shape of screw head (second digit) –

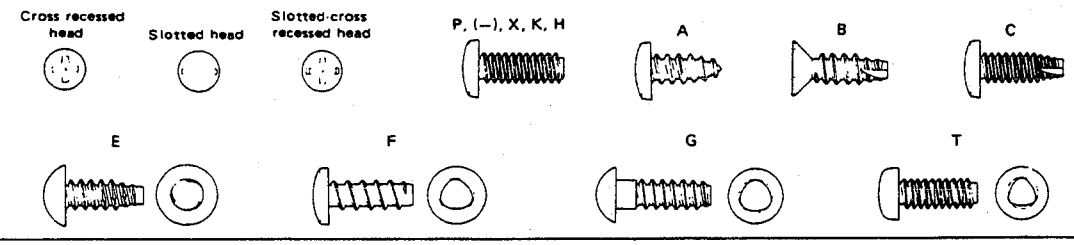
Material (third digit)

- S Steel
- E Stainless steel
- C Cast iron
- U Copper
- B Brass
- P Phosphor bronze
- N Nickel silver
- Y Cast brass
- A Aluminum
- Z Zinc alloy
- K Polycarbonate

Shape of thread (fourth digit)

- P Cross recessed head screws
- (–) Slotted head machine screws
- X Slotted-cross recessed head machine screws
- K Cross recessed head machine screws for precision equipment (type 1)
- H " (type 3)
- A Cross recessed head tapping screws (type 1)
- B " (type 2)
- C " (type 3)
- E Cross recessed head special tapping screws (brand : evertight)
- F " (brand : P-tight)
- T " (brand : taptight)
- G "

– Shape of thread (fourth digit) –



Nominal diameter (fifth and sixth digits)

The fifth and sixth digits are numbers indicating a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

Length (seventh and eighth digits)

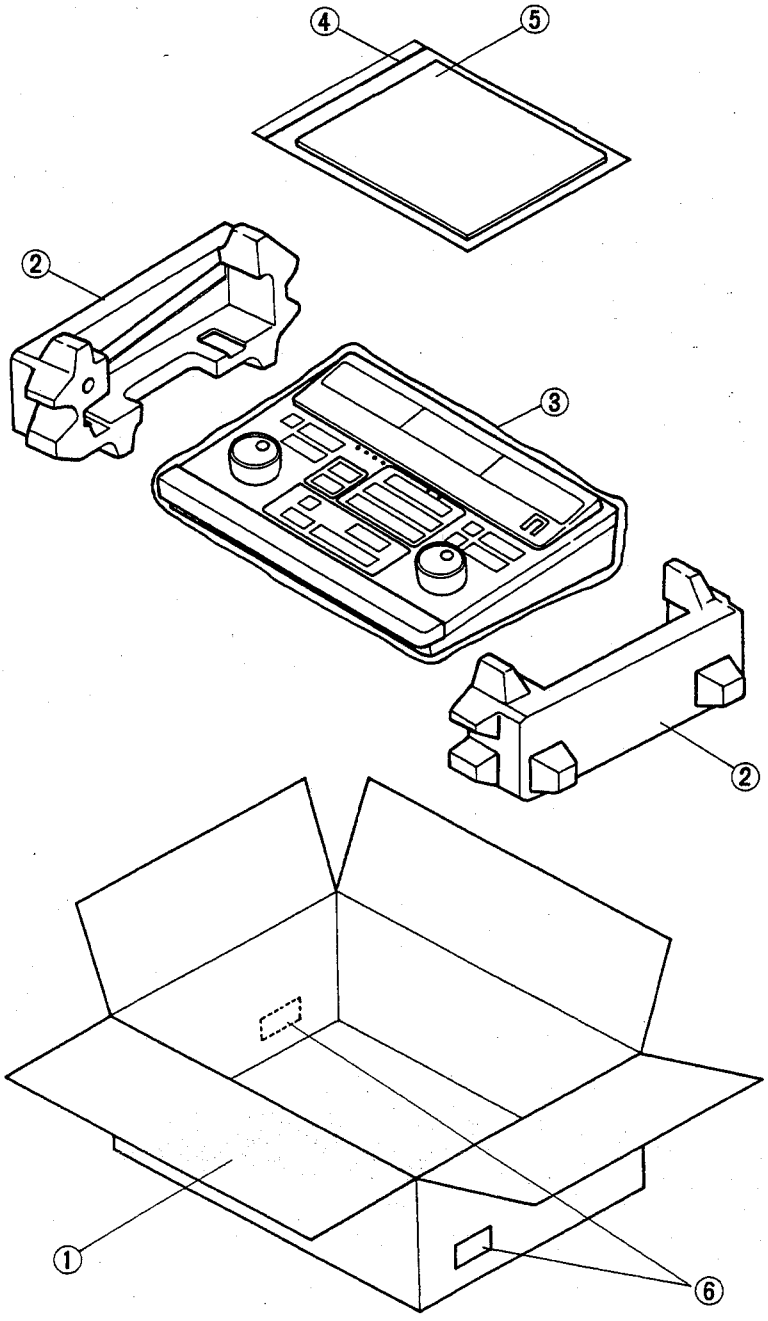
The seventh and eighth digits are numbers indicating length in milimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

Surface treatment (ninth digit)

- Z Dichromate treatment after galvanizing (MFZn II-C)
- N Nickel plating (MFNi II, MFNi I)
- R Chromium plating (MBCr II, MBCr I)
- G Silver plating (SP4)
- B Black coating after plating
- F Blackening of iron (FB)
- M Blackening after galvanizing
- K Pickling of brass (PF2)
- P Phosphate treatment
- W Uni-chrome plating
- L Coating with transparent paint
- A Coloring red after galvanizing (MFZn II-C)
- C Coloring blue after galvanizing (MFZn II-C)
- T Coloring green after galvanizing (MFZn II-C)
- V Coloring purple after galvanizing (MFZn II-C)

3.2 EXPLODED VIEWS AND PARTS LIST

3.2.1 Packing assembly <M1>



#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION

****

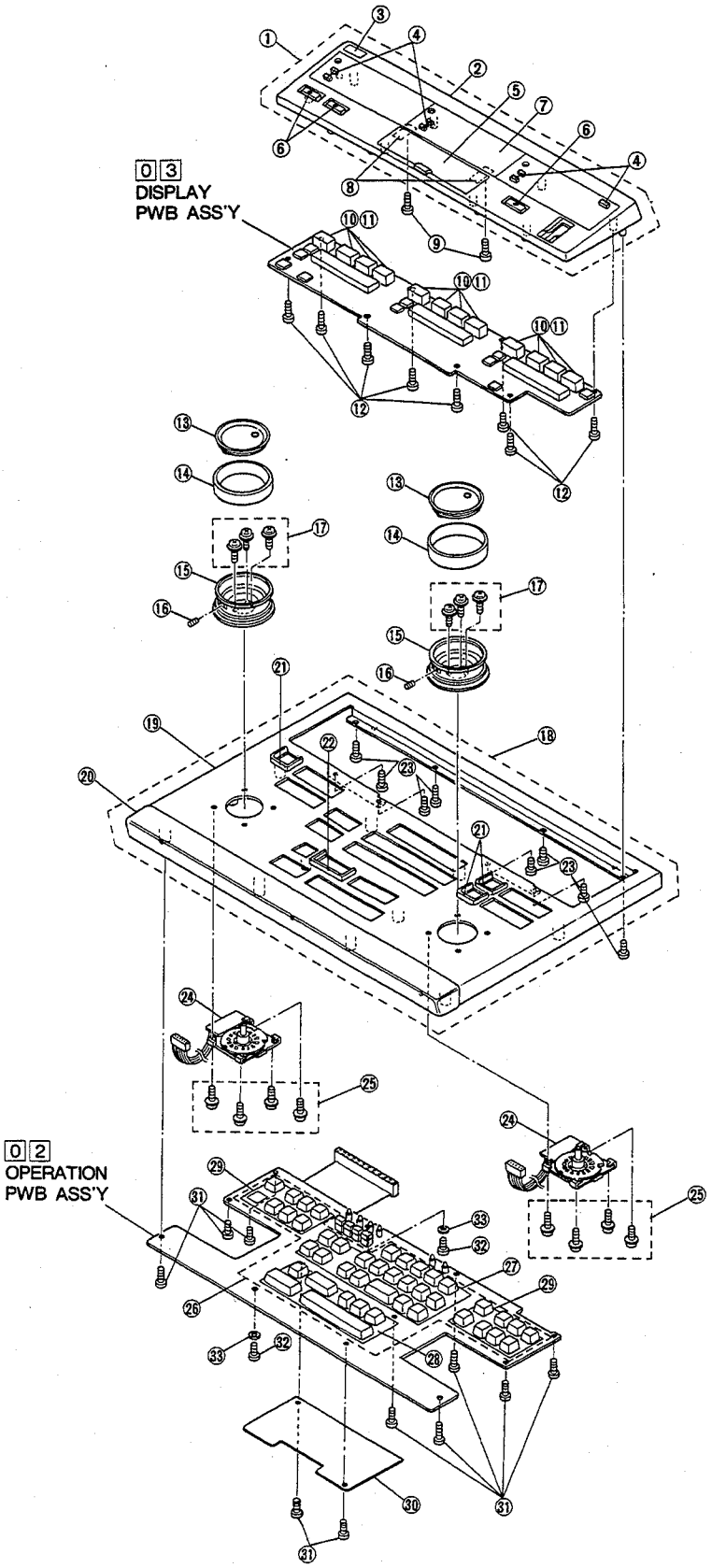
****
* PACKING ASSEMBLY <M1> *
****

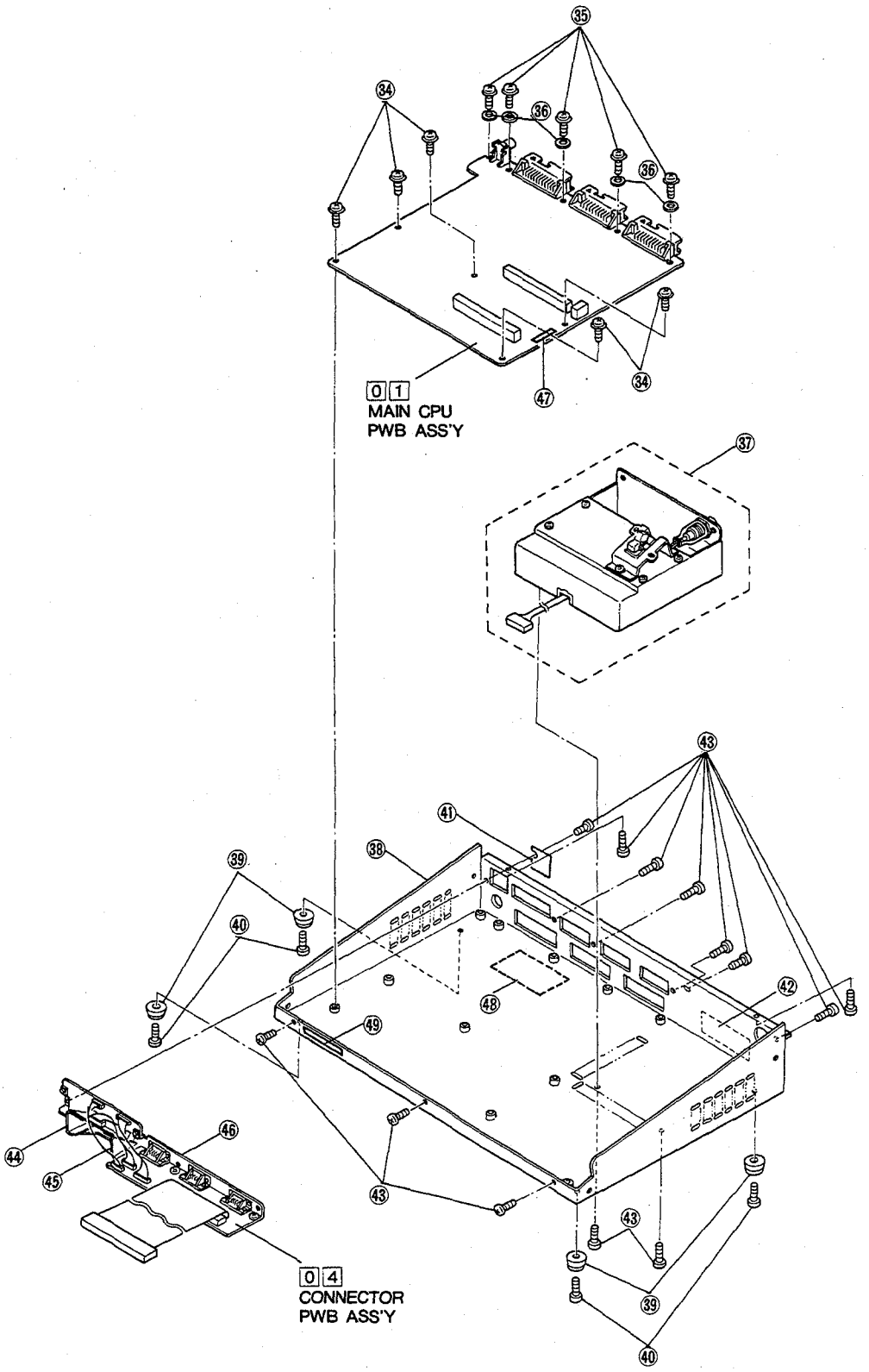
	1	PRD20322-03	PACKING CASE
	2	PRD20309A	CUSHION ASSY
	3	QPGA060-05005	POLY BAG
	4	QPGB024-03404	POLY BAG
⚠	5	PGD30002-225	INSTRUCTIONS
	6	PUP40619	SERIAL NO.STICKER

3.2.2 Chassis assembly <M2>

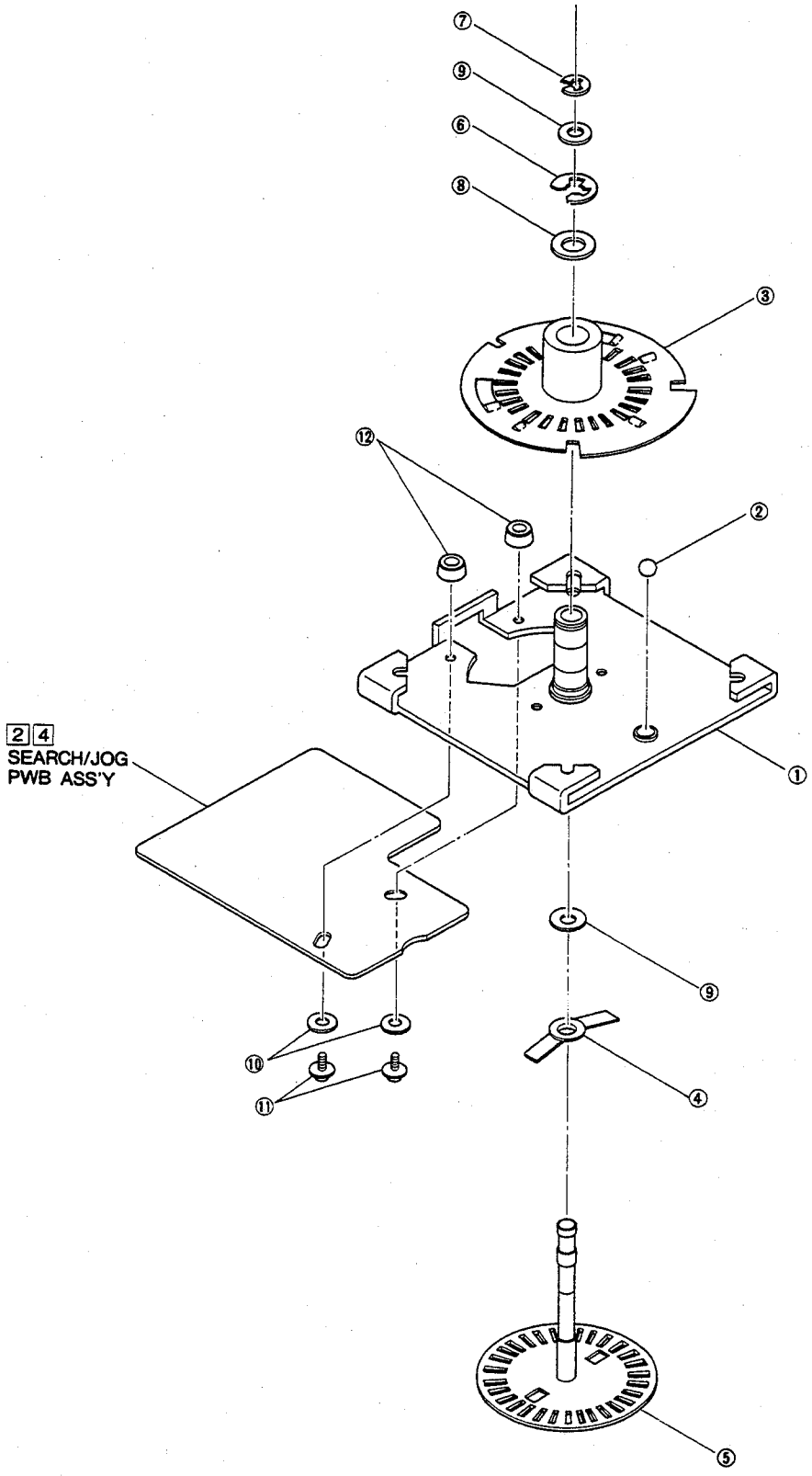
#	REF NO.	PART NO.	PART NAME, DESCRIPTION
			CHASSIS ASSEMBLY <M2>
	1	PRD10193C-01	D.PANEL ASS'Y
⚠	2	PRD10187-03-01	DISPLAY PANEL
	3	PGD30011	MARK
	4	PU50507-1-1	COUNTER KNOB ,X7
	5	PRD30627	DOOR
	6	PRD30629	KNOB ,X3
	7	PRD20317	WINDOW
	8	PRD43148	SPRING PLATE ,X2
	9	SDSF3006Z	SCREW ,X2
	10	PRD43147-01-01	LED CAP ,X12
	11	PRD43149-01-01	DISPLAY SHEET ,X3
		PRD43149-02-01	DISPLAY SHEET ,X3
		PRD43149-03-01	DISPLAY SHEET ,X3
		PRD43149-04-01	DISPLAY SHEET ,X3
	12	SDSF3006Z	SCREW ,X8
	13	PRD41819B	J.KNOB ASS'Y ,X2
	14	PRD41818	TIRE ,X2
	15	PRD30196-03	SEARCH KNOB ,X2
	16	YWS3004B	SET SCREW ,X2
	17	DPSP2006Z	SCREW ,X6
	18	PRD10191A-01	PANEL ASS'Y
⚠	19	PRD10206-01-01	PANEL
	20	PRD20330	PAD
	21	PRD43128-01-01	SW.GUARD(1) ,X3
	22	PRD43129-01-01	SW.GUARD(2)
	23	SDSF3006Z	SCREW ,X8
	24	PGS20128H-01	SEARCH/JOG CONTROL ASSY ,X2
	25	DPSP3008Z	SCREW ,X8
	26	PGZ01411A	KEYTOP ASS'Y
	27	PRD43168	BLIND SHEET
	28	PRD43169	BLIND SHEET
	29	PRD43170-01-01	BLIND SHEET ,X2
	30	PRD43314	INSULATOR
	31	SDSP3006Z	SCREW ,X10
	32	SDBP3006N	SCREW ,X2
	33	WNB3000N	WASHER ,X2
	34	SPSP3006Z	SCREW ,X5
	35	SDBP3006N	SCREW ,X5
	36	WBS3000N	WASHER ,X5
⚠	37	PGZ00286D-02	SW.REG.ASS'Y
	38	PRD10194A-01	CHASSIS ASS'Y
	39	QZF2207-001	FOOT ,X4
	40	SDSP3006R	SCREW ,X4
	41	PRD43316	SW.COVER
⚠	42	PRD30642-03	LABEL
	43	SDSP3006R	SCREW ,X13
	44	PRD43188-01-01	BRACKET
	45	PRD43189-01-01	BRACKET
	46	PRD30638	BRACKET
⚠	47	PRD30072-27	STICKER
⚠	48	PGD30031-23	SER.NO.LABEL
⚠	49	PU54559-2	LABEL

3.2.2 Chassis assembly <M2>




35
34
36
36
34
47
01
MAIN CPU
PWB ASS'Y
37
43
41
38
39
40
48
42
49
46
44
45
43
04
CONNECTOR
PWB ASS'Y
43
39
40

3.2.3 Search/jog control asembly <M3>



#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION

****

****
* SEARCH JOG CONTROL ASSEMBLY <M3> *
****

1	PRD41764A-04	BASE ASS'Y
2	PRD30028	STEEL BALL
3	PRD41768D	S.PLATE ASS'Y
4	PRD41770A-01	SPRING ASS'Y
5	PRD41761B	JOG PLATE ASS'Y
6	REE5000	E.RING
7	REE3000	"E"RING
8	Q03093-815	WASHER
9	Q03093-817	SPACER,X2
10	Q03093-829	WASHER,X2
11	DPSP2006Z	SCREW,X2
12	PRD41774-01-01	SPACER

SECTION 4
ELECTRICAL PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS :

RESISTORS—All resistance values are in ohms (Ω), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precision Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

CAPACITORS—All capacitance values are in μF, unless otherwise indicated.

pF	: μμF (Pico farad)
C Cap	: Ceramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metalized Mylar Capacitor
MP Cap	: Metalized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

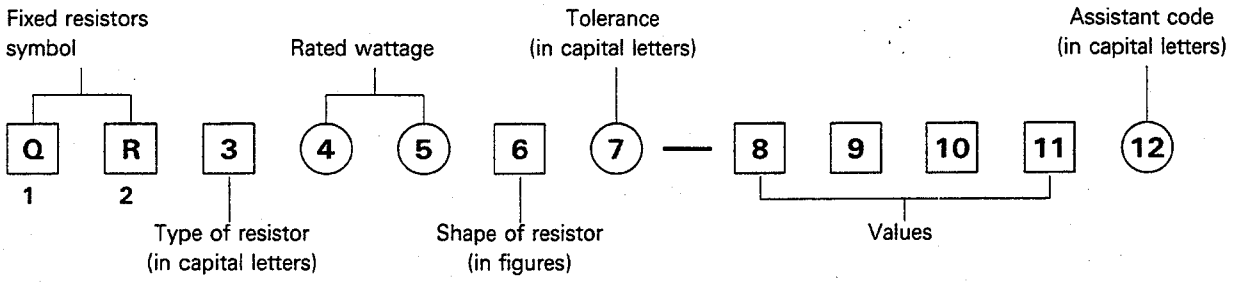
NOTES :

- [2 digits] indicates circuit board symbol number.
- "X "indicates quantity per set.

4.1 STANDARD PARTS NUMBER CODING

4.1.1 Fixed resistor coding

Fixed resistor part numbers are as follows.



Type of resistor(third digit)

C	Composition resistors
D	Carbon film resistors
F	Unflammable resistors
G	Oxide metal film resistors
H	Fusible resistors
M	Metal plate resistors
S	Metal glazed resistors
V	Precision metal film resistors
W	Wire wound resistors
X	Metal film resistors
Z	Special resistors

Rated wattage (fourth and fifth digits)

A0	1/10 W
18	1/8 W
16	1/6 W
14	1/4 W
12	1/2 W
01	1 W
02	2 W
03	3 W
04	4 W
05	5 W
06	6 W
07	7 W
75	7.5 W
08	8 W
10	10 W
15	15 W
A6	16 W
20	20 W
30	30 W

Tolerance (seventh digit)

F	±1 %
G	±2 %
J	±5 %
K	±10 %
M	±20 %

Assistant code (twelfth digit)

A	Small type
B	Small type
S	Small type
Y	Lead taping
Z	Lead taping

Values (eighth – tenth or eleventh digits)

examples:

R47		0.47 Ω
4R7		4.7 Ω
470	47×10^{0}	47 Ω
471	47×10^{1}	470 Ω
472	47×10^{2}	4.7 kΩ
473	47×10^{3}	47 kΩ
474	47×10^{4}	470 kΩ
475	47×10^{5}	4.7 MΩ

QRV resistance shown by four digits:

4640	464×10^{0}	464 Ω
4641	464×10^{1}	4.64 kΩ
4642	464×10^{2}	46.4 kΩ

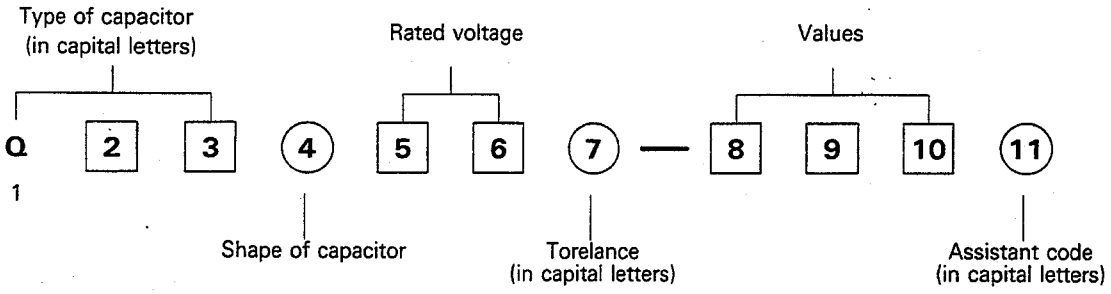
Shape of resistor(sixth digit)

Note: ■ indicates flame retardant resistor.

Shape of resistor \ Type of resistor	C	D	F	G	H	M	S	V	W	X
1										
2										
3										
4										
5									(L)type	
6										
7			Lug (B)type							
8			Lug (A)type				Chip			
9			Lug (C)type							

4.1.2 Fixed capacitor coding

Fixed capacitor part numbers are as follows.



Ceramic capacitors

Type of capacitor (first – third digits)		Shape of capacitor(fourth digit)				
Symbol	Characteristics	Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1,4	3			8,A
QCS	Temperature compensation	1	3	4	5	8,A
QCT	Temperature compensation	Special coding				8,A
QCV	Ceramic			1	3	
QCX	Ceramic			1	3	
QCY	High capacitance	1,4	3	6	7	8,A
QCZ	Special type	Special coding				
QCB	Ceramic			B	C	

Electrolytic capacitors

Type of capacitor (first-third digits)		Shape of capacitor(fourth digit)				
Symbol	Characteristics	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEB	Low leakage		4	5	6	
QEC	Low leakage		4,8,A	9,B	6,C	
QEE	Tantalum(normal)		4	5	6	
	Tantalum(small)		8			
QEF	Chip tantalum	8(chip type)				
QEG	Low impedance		4			
QEK	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4,A	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar(small)		4,A	5,B	6,C	
QER	Miniature type		4	5	6	
QET	Small type	2	4,A	5,B	6,C	7
QEU	Small type		4	5	6	
QEV	Small type		4		6	7
QEW	Normal	2	4	5	6	7

Paper film capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
		Tubular	Normal		Flame retardant	
Symbol	Characteristics		Mono-direction	Kink lead	Mono-direction	Kink lead
QFA	Metalized polypropylene				7	
QFE	Metalized mylar				5	
QFF	Film mica		4			
QFG	Polypropylene film		4	8		
QFH	Metalized mylar	2	4	3	5,7	6
QFJ	Mylar (special)		4			
QFK	Metalized mylar (small)				5	
QFM	Mylar	2	4	3,7	5	6
QFN	Mylar (small)		4	3		
QFP	Polypropylene		4	3,8		
QFS	Polystyrole	2	4	3		
QFV	Thin film		4	8		
QFZ	Special type	Special coding				

Rated voltage (fifth and sixth digits)

Fifth digit \ Sixth digit	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15	4.0		6.3				
1	10		16	20	25		40	50	63	80	35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

Tolerance (seventh digit)

A	$^{+100}_{-10}$ %	M	± 20 %
F	± 1 %	N	± 30 %
G	± 2 %	P	$^{+100}_{-0}$ %
H	$^{+50}_{-10}$ %	R	$^{+30}_{-10}$ %
J	± 5 %	X	$^{+40}_{-20}$ %
K	± 10 %	Z	$^{+80}_{-20}$ %

Values (eighth – tenth digits)

Example : Values are in picofarads

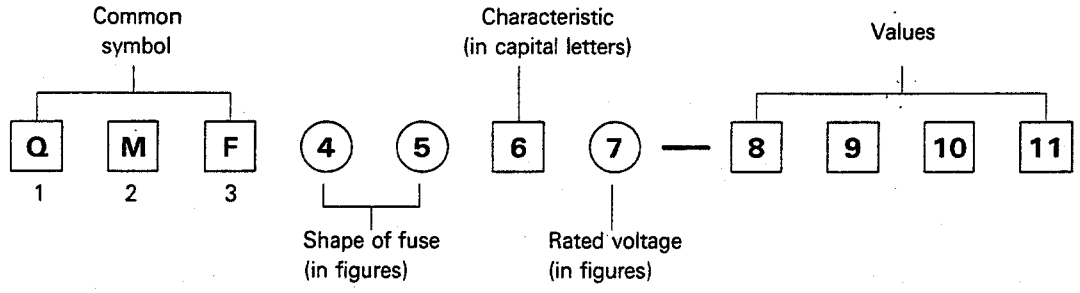
101	····· 10×10^1	pF ·····	100 pF
102	····· 10×10^2	pF ·····	1,000 pF (0.001 μF)
103	····· 10×10^3	pF ·····	10,000 pF (0.01 μF)
104	····· 10×10^4	pF ·····	100,000 pF (0.1 μF)
105	····· 10×10^5	pF ·····	1 μF
5R0	·····		5.0 pF

Assistant code (eleventh digit)

G Small size
Z Lead taping
Y Lead taping

4.1.3 Fuse coding

Standard fuse part numbers are as follows.



Shape of fuse (fourth and fifth digits)

51	φ5.2×20 mm
60	φ6.4×30 mm
61	φ6.35×31.8 mm
63	φ6.4×30 mm with lead wires
66	φ6.35×31.8 mm with lead wires
00	Special type

Rated voltage (seventh digit)

1	AC125 V
2	AC250 V
3	0.1–1 A : AC250 V 1.25–6.3 A : AC125 V

Values (eighth-tenth or eleventh digits)

example:

R63	0.63 A
1R0	1.0 A
2R5	2.5 A
100	10 A
R315	0.315 A
1R25	1.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type(for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type(for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type(for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type(for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % – 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type(for UL)
	200 %	Within 2 min.	
	800 % – 2000 %	Within 0.01 sec.	

⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
			**********
			* MAIN CPU BOARD ASSEMBLY <01> *
			**********
	PWBA	PGE10146C-01	MAIN CPU ASS'Y
	IC1	UPC358C	IC
	IC2	UPC358C	IC
	IC3	UPC358C	IC
	IC4	TC4053BP	IC
	IC5	TC4053BP	IC
	IC6	TC4053BP	IC
	IC7	MN50005JVE	IC
	IC8	TC74HC14AP	IC
	IC9	TD62083AP	IC
	IC10	TD62083AP	IC
	IC11	TC74HC14AP	IC
	IC12	TD62083AP	IC
	IC13	TD62083AP	IC
	IC14	TC74HC14AP	IC
	IC15	TC74HC240AP	IC
	IC16	TD62083AP	IC
	IC17	TD62083AP	IC
	IC18	TD62083AP	IC
	IC19	TMP82C255AN-2	IC
	IC20	TMP82C255AN-2	IC
	IC21	TMP82C255AN-2	IC
	IC22	VC2054	IC
	IC23	VC2054	IC
	IC24	VC2054	IC
	IC25	TC74HC368AP	IC
	IC26	TMPZ84C30AP-6	IC
	IC27	TC74HC138AP	IC
	IC28	TC74HC138AP	IC
	IC29	TC74HC138AP	IC
	IC30	TC74HC00AP	IC
	IC31	TC74HC193AP	IC
	IC32	MC3487P	IC
	IC33	MC3486P	IC
	IC34	TMPZ84C30AP-6	IC
	IC35	TC4020BP	IC
	IC36	TMP82C255AN-2	IC
	IC37	TMPZ84C40AP-6	IC
	IC38	TMPZ84C30AP-6	IC
	IC39	TC74HC393AP	IC
	IC40	TC74HC20AP	IC
	IC41	TC74HC00AP	IC
	IC42	TC74HC193AP	IC
	IC43	TMPZ84C40AP-6	IC
	IC44	TC5564APL-15	IC
	IC45	TC74HC139AP	IC
	IC46	TC74HC08AP	IC
	IC47	TC74HC32AP	IC
	IC48	TD62083AP	IC
	IC49	PGD30621-03-01	IC
	IC50	TMPZ84C00AP-6	IC
	IC51	TC74HC14AP	IC
	IC52	MSM5210RS	IC
	IC53	MSM5210RS	IC
	IC54	TC74HC74AP	IC
	IC55	M51957BL	IC
	Q1	2SC2206(C)	TRANSISTOR
	Q2	2SC2206(C)	TRANSISTOR
	Q3	2SC2206(C)	TRANSISTOR
	Q4	2SA1015Y	TRANSISTOR
	Q5	DTC124EF	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	1SS133	DIODE
	D5	1SS133	DIODE
	D6	1SS133	DIODE
	D7	1SS133	DIODE
	D8	1SS133	DIODE
	D9	1SS133	DIODE
	D10	1SS133	DIODE
	D11	1SS133	DIODE
	D12	1SS133	DIODE
	D13	1SS133	DIODE
	D14	1SS133	DIODE
	D15	1SS133	DIODE
	D16	1SS133	DIODE
	D17	1SS133	DIODE
	D18	1SS133	DIODE
	D19	1SS133	DIODE
	D20	1SS133	DIODE

⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D21	1SS133	DIODE
	D22	1SS133	DIODE
	D23	1SS133	DIODE
	D24	1SS133	DIODE
	D25	1SS133	DIODE
	D26	1SS133	DIODE
	D27	1SS133	DIODE
	D28	1SS133	DIODE
	D29	1SS133	DIODE
	D30	1SS133	DIODE
	D31	1SS133	DIODE
	D32	1SS133	DIODE
	D33	1SS133	DIODE
	D34	1SS133	DIODE
	D35	1SS133	DIODE
	D36	1SS133	DIODE
	D37	1SS133	DIODE
	D38	1SS133	DIODE
	D39	1SS133	DIODE
	D40	1SS133	DIODE
	D41	1SS133	DIODE
	D42	1SS133	DIODE
	DA1	DAN401	DIODE ARRAYS
	DA2	DAN401	DIODE ARRAYS
	DA3	DAN401	DIODE ARRAYS
	DA4	DAN401	DIODE ARRAYS
⚠	R1	QRD167J-750	RESISTOR
	R2	QRD167J-333	RESISTOR
	R3	QRD167J-181	RESISTOR
	R4	QRD167J-333	RESISTOR
	R5	QRD167J-102	RESISTOR
	R6	QRD167J-681	RESISTOR
	R7	QRD167J-681	RESISTOR
	R8	QRD167J-271	RESISTOR
	R9	QRD167J-103	RESISTOR
	R10	QRD167J-222	RESISTOR
	R11	QRD167J-222	RESISTOR
	R12	QRD167J-271	RESISTOR
	R13	QRD167J-154	RESISTOR
	R14	QRD167J-222	RESISTOR
	R15	QRD167J-103	RESISTOR
	R16	QRD167J-223	RESISTOR
	R17	QRD167J-103	RESISTOR
	R18	QRD167J-153	RESISTOR
	R19	QRD167J-102	RESISTOR
	R20	QRD167J-223	RESISTOR
	R21	QRD167J-101	RESISTOR
	R22	QRD167J-103	RESISTOR
	R23	QRD167J-103	RESISTOR
	R24	QRD167J-101	RESISTOR
	R25	QRD167J-101	RESISTOR
	R26	QRD167J-101	RESISTOR
	R27	QRD167J-101	RESISTOR
	R28	QRD167J-101	RESISTOR
	R29	QRD167J-101	RESISTOR
	R30	QRD167J-101	RESISTOR
	R31	QRD167J-101	RESISTOR
	R32	QRD167J-101	RESISTOR
	R33	QRD167J-101	RESISTOR
	R34	QRD167J-101	RESISTOR
	R35	QRD167J-101	RESISTOR
	R36	QRD167J-101	RESISTOR
	R37	QRD167J-101	RESISTOR
	R38	QRD167J-101	RESISTOR
	R39	QRD167J-101	RESISTOR
	R40	QRD167J-103	RESISTOR
	R41	QRD167J-223	RESISTOR
	R42	QRD167J-103	RESISTOR
	R43	QRD167J-153	RESISTOR
	R44	QRD167J-102	RESISTOR
	R45	QRD167J-223	RESISTOR
	R46	QRD167J-101	RESISTOR
	R47	QRD167J-103	RESISTOR
	R48	QRD167J-103	RESISTOR
	R49	QRD167J-101	RESISTOR
	R50	QRD167J-101	RESISTOR
	R51	QRD167J-101	RESISTOR
	R52	QRD167J-101	RESISTOR
	R53	QRD167J-101	RESISTOR
	R54	QRD167J-101	RESISTOR
	R55	QRD167J-101	RESISTOR
	R56	QRD167J-101	RESISTOR
	R57	QRD167J-101	RESISTOR
	R58	QRD167J-101	RESISTOR
	R59	QRD167J-101	RESISTOR
	R60	QRD167J-101	RESISTOR
	R61	QRD167J-101	RESISTOR

⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R62	QRD167J-101	RESISTOR
	R63	QRD167J-101	RESISTOR
	R64	QRD167J-101	RESISTOR
	R65	QRD167J-103	RESISTOR
	R66	QRD167J-223	RESISTOR
	R67	QRD167J-103	RESISTOR
	R68	QRD167J-153	RESISTOR
	R69	QRD167J-102	RESISTOR
	R70	QRD167J-223	RESISTOR
	R71	QRD167J-101	RESISTOR
	R72	QRD167J-103	RESISTOR
	R73	QRD167J-103	RESISTOR
	R74	QRD167J-101	RESISTOR
	R75	QRD167J-101	RESISTOR
	R76	QRD167J-101	RESISTOR
	R77	QRD167J-101	RESISTOR
	R78	QRD167J-101	RESISTOR
	R79	QRD167J-101	RESISTOR
	R80	QRD167J-101	RESISTOR
	R81	QRD167J-101	RESISTOR
	R82	QRD167J-101	RESISTOR
	R83	QRD167J-101	RESISTOR
	R84	QRD167J-101	RESISTOR
	R85	QRD167J-101	RESISTOR
	R86	QRD167J-101	RESISTOR
	R87	QRD167J-101	RESISTOR
	R88	QRD167J-101	RESISTOR
	R89	QRD167J-101	RESISTOR
	R90	QRD167J-101	RESISTOR
	R91	QRD167J-101	RESISTOR
	R92	QRD167J-101	RESISTOR
	R93	QRD167J-101	RESISTOR
	R94	QRD167J-101	RESISTOR
	R95	QRD167J-101	RESISTOR
	R96	QRD167J-101	RESISTOR
	R97	QRD167J-101	RESISTOR
	R98	QRD167J-105	RESISTOR
	R99	QRD167J-102	RESISTOR
⚠	R100	QRD167J-330	RESISTOR
⚠	R101	QRD167J-330	RESISTOR
⚠	R102	QRD167J-330	RESISTOR
⚠	R103	QRD167J-330	RESISTOR
⚠	R104	QRD167J-330	RESISTOR
⚠	R105	QRD167J-330	RESISTOR
	R106	QRD167J-101	RESISTOR
	R107	QRD167J-101	RESISTOR
	R108	QRD167J-101	RESISTOR
	R109	QRD167J-102	RESISTOR
	R110	QRD167J-102	RESISTOR
	R111	QRD167J-102	RESISTOR
	R112	QRD167J-102	RESISTOR
	R113	QRD167J-102	RESISTOR
	R114	QRD167J-102	RESISTOR
	R115	QRD167J-103	RESISTOR
	R116	QRD167J-103	RESISTOR
	R117	QRD167J-103	RESISTOR
	R118	QRD167J-103	RESISTOR
	R119	QRD167J-103	RESISTOR
	R120	QRD167J-103	RESISTOR
	R121	QRD167J-103	RESISTOR
	R122	QRD167J-101	RESISTOR
	R123	QRD167J-101	RESISTOR
	R124	QRD167J-103	RESISTOR
	R125	QRD167J-103	RESISTOR
⚠	R126	QRD167J-100	RESISTOR
⚠	R127	QRD167J-100	RESISTOR
⚠	R128	QRD167J-100	RESISTOR
⚠	R129	QRD167J-100	RESISTOR
⚠	R130	QRD167J-100	RESISTOR
⚠	R131	QRD167J-100	RESISTOR
⚠	R132	QRD167J-100	RESISTOR
⚠	R133	QRD167J-100	RESISTOR
	R134	QRD167J-103	RESISTOR
	R135	QRD167J-103	RESISTOR
	R136	QRD167J-103	RESISTOR
	R137	QRD167J-472	RESISTOR
	R138	QRD167J-103	RESISTOR
	R139	QRD167J-103	RESISTOR
	R140	QRD167J-103	RESISTOR
	R141	QRD167J-103	RESISTOR
	R142	QRD167J-103	RESISTOR
	R143	QRD167J-103	RESISTOR
	R144	QRD167J-103	RESISTOR
	R145	QRD167J-103	RESISTOR
	R146	QRD167J-393	RESISTOR
	R147	QRD167J-153	RESISTOR
	R148	QRD167J-682	RESISTOR
	R149	QRD167J-101	RESISTOR
	R150	QRD167J-101	RESISTOR

⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R151	QRD167J-151	RESISTOR
	R152	QRD161J-101	RESISTOR
	RA1	QRB08AJ-103	R NETWORK
	RA2	QRB08AJ-103	R NETWORK
	RA3	QRB08AJ-103	R NETWORK
	RA4	QRB08AJ-103	R NETWORK
	RA5	QRB08AJ-103	R NETWORK
	RA6	QRB08AJ-103	R NETWORK
	RA7	QRB08AJ-103	R NETWORK
	RA8	QRB08AJ-103	R NETWORK
	RA9	QRB08AJ-103	R NETWORK
	RA10	QRB08BG-103	NETWORK RESISTOR
	RA11	QRB08BG-103	NETWORK RESISTOR
	RA12	QRB08BG-103	NETWORK RESISTOR
	RA13	EXB-P88103M	NETWORK RESISTOR
	RA14	QRB08AJ-103	R NETWORK
	RA15	QRB08AJ-103	R NETWORK
	C1	QEN41AM-107	E CAPACITOR
	C2	QETA1AM-107	E CAPACITOR
	C3	QCF11HP-103	CAPACITOR
	C4	QCS11HJ-680	CAPACITOR
	C5	QCS11HJ-221	CAPACITOR
	C6	QCS11HJ-680	CAPACITOR
	C7	QETA1AM-476	E CAPACITOR
	C8	QCF11HP-103	CAPACITOR
	C9	QEN41HM-474	NP E CAPACITOR
	C10	QCF11HP-103	CAPACITOR
	C11	QCF11HP-103	CAPACITOR
	C12	QETA1CM-107	E CAPACITOR
	C13	QCZ0208-104	MC CAP
	C14	QCZ0208-104	MC CAP
	C15	QCF11HP-103	CAPACITOR
	C16	QETA1CM-107	E CAPACITOR
	C17	QCZ0208-104	MC CAP
	C18	QCF11HP-103	CAPACITOR
	C19	QCZ0208-104	MC CAP
	C20	QCF11HP-103	CAPACITOR
	C21	QETA1CM-107	E CAPACITOR
	C22	QCZ0208-104	MC CAP
	C23	QCZ0208-104	MC CAP
	C24	QCF11HP-102	CAPACITOR
	C25	QCS11HJ-561	CAPACITOR
	C26	QFN41HJ-152	M CAPACITOR
	C27	QETA1CM-477	E CAPACITOR
	C28	QCZ0208-104	MC CAP
	C29	QCZ0208-104	MC CAP
	C30	QCZ0208-104	MC CAP
	C31	QCZ0208-104	MC CAP
	C32	QCZ0208-104	MC CAP
	C33	QETA1AM-107	E CAPACITOR
	C34	QCZ0208-104	MC CAP
	C35	QCZ0208-104	MC CAP
	C36	QCZ0208-104	MC CAP
	C37	QCZ0208-104	MC CAP
	C38	QCZ0208-104	MC CAP
	C39	QCS11HJ-100	CAPACITOR
	C40	QCZ0208-104	MC CAP
	C41	QCS11HJ-100	CAPACITOR
	C42	QCZ0208-104	MC CAP
	C43	QCZ0208-104	MC CAP
	C44	QETA1CM-477	E CAPACITOR
	C45	QCZ0208-104	MC CAP
	C46	QCZ0208-104	MC CAP
	C47	QCZ0208-104	MC CAP
	C48	QCZ0208-104	MC CAP
	C49	QCZ0208-104	MC CAP
	C50	QCZ0208-104	MC CAP
	C51	QCZ0208-104	MC CAP
	C52	QCZ0208-104	MC CAP
	C53	QCZ0208-104	MC CAP
	C54	QCZ0208-104	MC CAP
	C55	QCZ0208-104	MC CAP
	C56	QETA1CM-477	E CAPACITOR
	C57	QCZ0208-104	MC CAP
	C58	QCZ0208-104	MC CAP
	C59	QCZ0208-104	MC CAP
	C60	QCZ0208-104	MC CAP
	C61	QCZ0208-104	MC CAP
	C62	QCZ0208-104	MC CAP
	C63	QCZ0208-104	MC CAP
	C64	QCZ0208-104	MC CAP
	C65	QCZ0208-104	MC CAP
	C66	QCZ0208-104	MC CAP
	C67	QETA1CM-477	E CAPACITOR
	C68	QCZ0208-104	MC CAP
	C69	QCZ0208-104	MC CAP
	C70	QCZ0208-104	MC CAP
	C71	QCZ0208-104	MC CAP

*⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C72	QCS11HJ-820	CAPACITOR
	C73	QCZ0208-104	MC CAP
	C74	QCS11HJ-820	CAPACITOR
	C75	QCF11HP-102	CAPACITOR
	C76	QCF11HP-102	CAPACITOR
	C77	QETA1CM-477	E CAPACITOR
	C78	QCF11HP-103	CAPACITOR
	C79	QCF11HP-103	CAPACITOR
	C80	QCS11HJ-221	CAPACITOR
	C82	QCS11HJ-101	CAPACITOR
	C83	QCS11HJ-101	CAPACITOR
	C84	QCS11HJ-121	CAPACITOR
	C85	QCS11HJ-101	CAPACITOR
	C86	QCF11HP-103	CAPACITOR
	C87	QCF11HP-103	CAPACITOR
	C88	QCF11HP-103	CAPACITOR
	C89	QCF11HP-103	CAPACITOR
	C90	QCS11HJ-101	CAPACITOR
	C91	QCS11HJ-101	CAPACITOR
	L1	PU48530-680J	COIL
	L2	PU48530-680J	COIL
	L3	PGZ00618-221	COIL
	L4	PGZ00618-221	COIL
	L5	PGZ00618-221	COIL
⚠	X1	PGZ00067-02	CRYSTAL RESONATOR
	SW1	QSS1K81-L01	DIP SW
	SW2	QSS1K81-L01	DIP SW
⚠	VA1	PU49624-2	VARISTOR
⚠	VA2	PU49624-2	VARISTOR
⚠	VA3	PU49624-2	VARISTOR
⚠	VA4	PU49624-2	VARISTOR
⚠	VA5	PU49624-2	VARISTOR
⚠	VA6	PU49624-2	VARISTOR
⚠	VA7	PU49624-2	VARISTOR
⚠	VA8	PU49624-2	VARISTOR
⚠	VA9	PU49624-2	VARISTOR
⚠	VA10	PU49624-2	VARISTOR
⚠	VA11	PU49624-2	VARISTOR
⚠	VA12	PU49624-2	VARISTOR
⚠	VA13	PU49624-2	VARISTOR
⚠	VA14	PU49624-2	VARISTOR
⚠	VA15	PU49624-2	VARISTOR
⚠	VA16	PU49624-2	VARISTOR
⚠	VA17	PU49624-2	VARISTOR
⚠	VA18	PU49624-2	VARISTOR
⚠	VA19	PU49624-2	VARISTOR
⚠	VA20	PU49624-2	VARISTOR
⚠	VA21	PU49624-2	VARISTOR
⚠	VA22	PU49624-2	VARISTOR
⚠	VA23	PU49624-2	VARISTOR
⚠	VA24	PU49624-2	VARISTOR
⚠	VA25	PU49624-2	VARISTOR
⚠	VA26	PU49624-2	VARISTOR
⚠	VA27	PU49624-2	VARISTOR
⚠	VA28	PU49624-2	VARISTOR
⚠	VA29	PU49624-2	VARISTOR
⚠	VA30	PU49624-2	VARISTOR
⚠	VA31	PU49624-2	VARISTOR
⚠	VA32	PU49624-2	VARISTOR
⚠	VA33	PU49624-2	VARISTOR
⚠	VA34	PU49624-2	VARISTOR
⚠	VA35	PU49624-2	VARISTOR
⚠	VA36	PU49624-2	VARISTOR
⚠	VA37	PU49624-2	VARISTOR
⚠	VA38	PU49624-2	VARISTOR
⚠	VA39	PU49624-2	VARISTOR
⚠	VA40	PU49624-2	VARISTOR
⚠	VA41	PU49624-2	VARISTOR
⚠	VA42	PU49624-2	VARISTOR
⚠	VA43	PU49624-2	VARISTOR
⚠	VA44	PU49624-2	VARISTOR
⚠	VA45	PU49624-2	VARISTOR
⚠	VA46	PU49624-2	VARISTOR
⚠	VA47	PU49624-2	VARISTOR
⚠	VA48	PU49624-2	VARISTOR
⚠	VA49	PU49624-2	VARISTOR
⚠	VA50	PU49624-2	VARISTOR
⚠	VA51	PU49624-2	VARISTOR
⚠	VA52	PU49624-2	VARISTOR
⚠	VA53	PU49624-2	VARISTOR
⚠	VA54	PU49624-2	VARISTOR
⚠	VA55	PU49624-2	VARISTOR
⚠	VA56	PU49624-2	VARISTOR
⚠	VA57	PU49624-2	VARISTOR
⚠	VA58	PU49624-2	VARISTOR
⚠	VA59	PU49624-2	VARISTOR
⚠	VA60	PU49624-2	VARISTOR

*⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
⚠	VA61	PU49624-2	VARISTOR
⚠	VA62	PU49624-2	VARISTOR
⚠	VA63	PU49624-2	VARISTOR
⚠	VA64	PU49624-2	VARISTOR
⚠	VA65	PU49624-2	VARISTOR
⚠	VA66	PU49624-2	VARISTOR
⚠	VA67	PU49624-2	VARISTOR
⚠	VA68	PU49624-2	VARISTOR
⚠	VA69	PU49624-2	VARISTOR
⚠	VA70	PU49624-2	VARISTOR
⚠	VA71	PU49624-2	VARISTOR
⚠	VA72	PU49624-2	VARISTOR
⚠	VA73	PU49624-2	VARISTOR
⚠	VA74	PU49624-2	VARISTOR
⚠	VA75	PU49624-2	VARISTOR
⚠	VA76	PU49624-2	VARISTOR
⚠	VA77	PU49624-2	VARISTOR
⚠	VA78	PU49624-2	VARISTOR
⚠	VA79	PU49624-2	VARISTOR
⚠	VA80	PU49624-2	VARISTOR
⚠	VA81	PU49624-2	VARISTOR
⚠	VA82	PU49624-2	VARISTOR
⚠	VA83	PU49624-2	VARISTOR
⚠	VA84	PU49624-2	VARISTOR
⚠	VA85	PU49624-2	VARISTOR
⚠	VA86	PU49624-2	VARISTOR
⚠	VA87	PU49624-2	VARISTOR
⚠	VA88	PU49624-2	VARISTOR
⚠	VA89	PU49624-2	VARISTOR
⚠	VA90	PU49624-2	VARISTOR
⚠	VA91	PU49624-2	VARISTOR
⚠	VA92	PU49624-2	VARISTOR
⚠	VA93	PU49624-2	VARISTOR
⚠	VA94	PU49624-2	VARISTOR
⚠	VA95	PU49624-2	VARISTOR
⚠	VA96	PU49624-2	VARISTOR
⚠	VA97	PU49624-2	VARISTOR
⚠	VA98	PU49624-2	VARISTOR
⚠	VA99	PU49624-2	VARISTOR
⚠	VA100	PU49624-2	VARISTOR
⚠	VA101	PU49624-2	VARISTOR
⚠	VA102	PU49624-2	VARISTOR
	TP1	PGZ00587-00	TEST POINT
	CN1	PGZ01417	45P CONNECTOR
	CN2	PGZ01417	45P CONNECTOR
	CN3	PGZ01417	45P CONNECTOR
	CN4	PGZ01451	CONNECTOR
	CN5	PGZ01451	CONNECTOR
	CN6	PGZ01452	BNC CONNECTOR
	CN7	PU43351-3	CONNECTOR
⚠	F1	QMF51E2-2R0	FUSE

****

OPERATION BOARD ASSEMBLY <02>

****

PWBA	PGE10147A-01	OPERATION ASS'Y
IC1	TC74HC138AP	IC
IC2	TC74HC374AP	IC
IC3	TMP82C79P-2	IC
IC4	TC74HC138AP	IC
IC5	TMP82C79P-2	IC
IC6	TC74HC04AP	IC
IC7	TC74HC374AP	IC
IC8	TC74HC374AP	IC
IC9	TC74HC374AP	IC
IC10	TC74HC374AP	IC
IC11	TC74HC374AP	IC
IC12	TD62583AP	IC
IC13	TD62583AP	IC
IC14	TD62583AP	IC
IC15	TD62583AP	IC
IC16	TD62583AP	IC
IC17	TD62583AP	IC
IC18	TC74HC244AP	IC
IC19	TC74HC244AP	IC
IC20	TC74HC244AP	IC
IC21	TC74HC244AP	IC
IC22	TC74HC04AP	IC
D1	1SS133	DIODE
D2	1SS133	DIODE
D3	1SS133	DIODE
D4	1SS133	DIODE
D5	1SS133	DIODE
D6	1SS133	DIODE
D7	1SS133	DIODE

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D8	1SS133	DIODE
	D9	1SS133	DIODE
	LD1	TLS124	LE DIODE
	LD2	TLS124	LE DIODE
	LD3	TLS124	LE DIODE
	LD4	TLS124	LE DIODE
	LD5	TLS124	LE DIODE
	LD6	TLS124	LE DIODE
	D10	1SS133	DIODE
	D11	1SS133	DIODE
	D12	1SS133	DIODE
	D13	1SS133	DIODE
	D14	1SS133	DIODE
	D15	1SS133	DIODE
	D16	1SS133	DIODE
	D17	1SS133	DIODE
	D18	1SS133	DIODE
	D19	1SS133	DIODE
	D20	1SS133	DIODE
	D21	1SS133	DIODE
	D22	1SS133	DIODE
	D23	1SS133	DIODE
	D24	1SS133	DIODE
	D25	1SS133	DIODE
	D26	1SS133	DIODE
	D27	1SS133	DIODE
	D28	1SS133	DIODE
	D29	1SS133	DIODE
	D30	1SS133	DIODE
	D31	1SS133	DIODE
	D32	1SS133	DIODE
	D33	1SS133	DIODE
	D34	1SS133	DIODE
	D35	1SS133	DIODE
	D36	1SS133	DIODE
	D37	1SS133	DIODE
	D38	1SS133	DIODE
	D39	1SS133	DIODE
	D40	1SS133	DIODE
	D41	1SS133	DIODE
	D42	1SS133	DIODE
	D43	1SS133	DIODE
	D44	1SS133	DIODE
	D45	1SS133	DIODE
	D46	1SS133	DIODE
	D47	1SS133	DIODE
	D48	1SS133	DIODE
	D49	1SS133	DIODE
	D50	1SS133	DIODE
	D51	1SS133	DIODE
	D52	1SS133	DIODE
	R1	QRD167J-331	RESISTOR
	R2	QRD167J-331	RESISTOR
	R3	QRD167J-331	RESISTOR
	R4	QRD167J-331	RESISTOR
	R5	QRD167J-331	RESISTOR
	R6	QRD167J-331	RESISTOR
	R7	QRD167J-331	RESISTOR
	R8	QRD167J-331	RESISTOR
	R9	QRD167J-331	RESISTOR
	R10	QRD167J-331	RESISTOR
	R11	QRD167J-331	RESISTOR
	R12	QRD167J-331	RESISTOR
	R13	QRD167J-331	RESISTOR
	R14	QRD167J-331	RESISTOR
	R15	QRD167J-331	RESISTOR
	R16	QRD167J-331	RESISTOR
	R17	QRD167J-331	RESISTOR
	R18	QRD167J-331	RESISTOR
	R19	QRD167J-331	RESISTOR
	R20	QRD167J-331	RESISTOR
	R21	QRD167J-331	RESISTOR
	R22	QRD167J-331	RESISTOR
	R23	QRD167J-331	RESISTOR
	R24	QRD167J-331	RESISTOR
	R25	QRD167J-331	RESISTOR
	R26	QRD167J-331	RESISTOR
	R27	QRD167J-331	RESISTOR
	R28	QRD167J-331	RESISTOR
	R29	QRD167J-331	RESISTOR
	R30	QRD167J-331	RESISTOR
	R31	QRD167J-331	RESISTOR
	R32	QRD167J-331	RESISTOR
	R33	QRD167J-331	RESISTOR
	R34	QRD167J-331	RESISTOR
	R35	QRD167J-331	RESISTOR
	R36	QRD167J-122	RESISTOR
	R37	QRD167J-122	RESISTOR
	R38	QRD167J-122	RESISTOR
	R39	QRD167J-122	RESISTOR
	R40	QRD167J-122	RESISTOR
	R41	QRD167J-122	RESISTOR
	R42	QRD167J-331	RESISTOR
	R43	QRD167J-473	RESISTOR
	R44	QRD167J-103	RESISTOR
	R45	QRD167J-473	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R46	QRD167J-103	RESISTOR
	R47	QRD167J-473	RESISTOR
	R48	QRD167J-103	RESISTOR
	R49	QRD167J-473	RESISTOR
	R50	QRD167J-103	RESISTOR
	R51	QRD167J-473	RESISTOR
	R52	QRD167J-103	RESISTOR
	R53	QRD167J-473	RESISTOR
	R54	QRD167J-103	RESISTOR
	R55	QRD167J-473	RESISTOR
	R56	QRD167J-102	RESISTOR
	R57	QRD167J-104	RESISTOR
	R58	QRD167J-104	RESISTOR
	R59	QRD167J-103	RESISTOR
	R60	QRD121J-561	RESISTOR
	R61	QRD167J-330	RESISTOR
	R62	QRD167J-330	RESISTOR
	R63	QRD167J-330	RESISTOR
	R64	QRD167J-330	RESISTOR
	R65	QRD167J-330	RESISTOR
	R66	QRD167J-330	RESISTOR
	R67	QRD167J-330	RESISTOR
	R68	QRD167J-330	RESISTOR
	RA1	QRB085J-473M	NETWORK RESISTOR
	RA2	QRB085J-473M	NETWORK RESISTOR
	C1	QCZ0208-103	CAPACITOR
	C2	QCZ0208-103	CAPACITOR
	C3	QCZ0208-103	CAPACITOR
	C4	QCZ0208-103	CAPACITOR
	C5	QCZ0208-103	CAPACITOR
	C6	QCZ0208-103	CAPACITOR
	C7	QETA1CM-106	E CAPACITOR
	C8	QCZ0208-104	MC CAP
	C9	QCZ0208-104	MC CAP
	C10	QETA1CM-227	E CAPACITOR
	C11	QETA1CM-227	E CAPACITOR
	C12	QCZ0208-103	CAPACITOR
	C13	QCZ0208-103	CAPACITOR
	C14	QCZ0208-103	CAPACITOR
	C15	QCZ0208-103	CAPACITOR
	C16	QCZ0208-103	CAPACITOR
	C17	QCZ0208-103	CAPACITOR
	C18	QCZ0208-103	CAPACITOR
	C19	QCZ0208-103	CAPACITOR
	C20	QCZ0208-103	CAPACITOR
	C21	QCZ0208-103	CAPACITOR
	C22	QCZ0208-103	CAPACITOR
	C23	QCZ0208-103	CAPACITOR
	C24	QCZ0208-103	CAPACITOR
	C25	QCZ0208-103	CAPACITOR
	C26	QCZ0208-103	CAPACITOR
	C27	QCZ0208-103	CAPACITOR
	SW1	PGZ01412	PUSH SWITCH ,X32
	SW21	PGZ01413	PUSH SWITCH ,X10
⚠	VA1	PU49624	VARISTOR
⚠	VA2	PU49624	VARISTOR
⚠	VA3	PU49624	VARISTOR
⚠	VA4	PU49624	VARISTOR
⚠	VA5	PU49624	VARISTOR
⚠	VA6	PU49624	VARISTOR
⚠	VA7	PU49624	VARISTOR
⚠	VA8	PU49624	VARISTOR
	TP1	PU54983	TEST PIN ,X3
	CN2	PGZ01477-01	CABLE ASS'Y
	CN3	PGZ01477-02	CABLE ASS'Y
	CN5	PU58844-9	CONNECTOR
	CN6	PU58844-9	CONNECTOR

****

****
* DISPLAY BOARD ASSEMBLY <03> *
****

	PWBA	PGE20338A-01	DISPLAY PWB ASS'Y
	IC1	TC74HC4514AP	IC
	IC2	TC74HC238AP	IC
	IC3	TC74HC138AP	IC
	IC4	TC74HC138AP	IC
	IC5	TC74HC574AP	IC
	IC6	TC74HC574AP	IC
	IC7	TC74HC04AP	IC
	IC8	M54519P	IC
	IC9	M54519P	IC
	IC10	TD62083AP	IC
	IC11	TD62083AP	IC
	IC12	TD62083AP	IC
	IC13	BA618	IC
	IC14	BA618	IC
	IC15	BA618	IC
	IC16	BA618	IC
	D1	1SS133	DIODE

⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	1SS133	DIODE
	D5	1SS133	DIODE
	D6	1SS133	DIODE
	D7	1SS133	DIODE
	D8	1SS133	DIODE
	D9	1SS133	DIODE
	LD1	GL8T040	LE DIODE
	LD2	GL8T040	LE DIODE
	LD3	GL8T040	LE DIODE
	LD4	GL8T040	LE DIODE
	LD5	GL8T040	LE DIODE
	LD6	GL8T040	LE DIODE
	LD7	GL8T040	LE DIODE
	LD8	GL8T040	LE DIODE
	LD9	GL8T040	LE DIODE
	D10	1SS133	DIODE
	D11	1SS133	DIODE
	D12	1SS133	DIODE
	D13	1SS133	DIODE
	D14	1SS133	DIODE
	D15	1SS133	DIODE
	D16	1SS133	DIODE
	D17	1SS133	DIODE
	D18	1SS133	DIODE
	D19	1SS133	DIODE
	D20	1SS133	DIODE
	D21	1SS133	DIODE
	LD10	GL8T040	LE DIODE
	LD11	GL8T040	LE DIODE
	LD12	GL8T040	LE DIODE
	LD13	GL8T040	LE DIODE
	LD14	GL8T040	LE DIODE
	LD15	GL8T040	LE DIODE
	LD16	GL8T040	LE DIODE
	LD17	GL8T040	LE DIODE
	LD18	GL8T040	LE DIODE
	LD19	GL8T040	LE DIODE
	LD20	GL8T040	LE DIODE
	LD21	GL8T040	LE DIODE
	LD22	GL8T040	LE DIODE
	LD23	GL8T040	LE DIODE
	LD24	GL8T040	LE DIODE
	LD25	LT9230N	LE DIODE
		OR LT9230N3	LE DIODE
	LD26	LT9230N	LE DIODE
		OR LT9230N3	LE DIODE
	LD27	LT9230N	LE DIODE
		OR LT9230N3	LE DIODE
	LD28	LT9230N	LE DIODE
		OR LT9230N3	LE DIODE
	LD29	LT9230N	LE DIODE
		OR LT9230N3	LE DIODE
	LD30	LT9230N	LE DIODE
		OR LT9230N3	LE DIODE
	LD31	LT9230N	LE DIODE
		OR LT9230N3	LE DIODE
	LD32	LT9230N	LE DIODE
		OR LT9230N3	LE DIODE
	LD33	LT9230N	LE DIODE
		OR LT9230N3	LE DIODE
	LD34	LT9230N	LE DIODE
		OR LT9230N3	LE DIODE
	LD35	LT9230N	LE DIODE
		OR LT9230N3	LE DIODE
	LD36	LT9230N	LE DIODE
		OR LT9230N3	LE DIODE
	LD37	TLO124	LE DIODE
	LD38	TLO124	LE DIODE
	DA1	DAN403	DIODE
	DA2	DAN403	DIODE
	DA3	DAN403	DIODE
	DA4	DAN403	DIODE
	R1	QRD167J-331	RESISTOR
	R2	QRD121J-151	RESISTOR
	R3	QRD121J-151	RESISTOR
	R4	QRD121J-151	RESISTOR
	R5	QRD121J-151	RESISTOR
	R6	QRD167J-331	RESISTOR
	R7	QRD121J-151	RESISTOR
	R8	QRD121J-151	RESISTOR
	R9	QRD121J-151	RESISTOR
	R10	QRD121J-151	RESISTOR
	R11	QRD121J-151	RESISTOR
	R12	QRD121J-151	RESISTOR
	R13	QRD121J-151	RESISTOR
	R14	QRD121J-151	RESISTOR
	R15	QRD167J-473	RESISTOR
	R16	QRD167J-103	RESISTOR
	R17	QRD167J-473	RESISTOR
	R18	QRD167J-103	RESISTOR
	R19	QRD167J-151	RESISTOR
	R20	QRD167J-151	RESISTOR
	R21	QRD167J-151	RESISTOR
	R22	QRD167J-151	RESISTOR

⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R23	QRD167J-151	RESISTOR
	R24	QRD167J-151	RESISTOR
	R25	QRD167J-151	RESISTOR
	R26	QRD167J-151	RESISTOR
	R27	QRD167J-151	RESISTOR
	R28	QRD167J-151	RESISTOR
	R29	QRD167J-151	RESISTOR
	R30	QRD167J-151	RESISTOR
	R31	QRD167J-151	RESISTOR
	R32	QRD167J-151	RESISTOR
	R33	QRD167J-151	RESISTOR
	R34	QRD167J-151	RESISTOR
	R35	QRD167J-151	RESISTOR
	R36	QRD167J-151	RESISTOR
	R37	QRD167J-151	RESISTOR
	R38	QRD167J-151	RESISTOR
	R39	QRD167J-151	RESISTOR
	R40	QRD167J-151	RESISTOR
	R41	QRD167J-151	RESISTOR
	R42	QRD167J-151	RESISTOR
	R43	QRD167J-330	RESISTOR
	R44	QRD167J-330	RESISTOR
	R45	QRD167J-330	RESISTOR
	R46	QRD167J-330	RESISTOR
	R47	QRD167J-330	RESISTOR
	C1	QCZ0208-103	CAPACITOR
	C2	QCZ0208-103	CAPACITOR
	C3	QCZ0208-103	CAPACITOR
	C4	QCZ0208-103	CAPACITOR
	C5	QCZ0208-103	CAPACITOR
	C6	QCZ0208-103	CAPACITOR
	C7	QCZ0208-103	CAPACITOR
	C8	QCZ0208-103	CAPACITOR
	C9	QCZ0208-103	CAPACITOR
	C10	QETA1CM-227	E CAPACITOR
	C11	QETA1CM-227	E CAPACITOR
	SW1	PU49344	PUSH SWITCH
	SW2	PU49344	PUSH SWITCH
	SW3	PU49344	PUSH SWITCH
	SW4	PU49344	PUSH SWITCH
	SW5	PU49344	PUSH SWITCH
	SW6	PU49344	PUSH SWITCH
	SW7	PU49344	PUSH SWITCH
	SW8	PU49344	PUSH SWITCH
	SW9	PU49344	PUSH SWITCH
	SW10	PU49344	PUSH SWITCH
	SW11	PGZ01478	SLIDE SWITCH
	SW12	PGZ01478	SLIDE SWITCH
	SW13	PGZ01478	SLIDE SWITCH
	SW14	PGZ01478	SLIDE SWITCH
	SW15	PGZ01478	SLIDE SWITCH
	SW16	PGZ01478	SLIDE SWITCH
	SW17	PGZ01478	SLIDE SWITCH
	SW18	PGZ01454	SLIDE SWITCH
	SW19	QSS1K81-L01	DIP SW
	SW20	QSS1K81-L01	DIP SW
⚠	VA1	PU49624	VARISTOR
⚠	VA2	PU49624	VARISTOR
⚠	VA3	PU49624	VARISTOR
⚠	VA4	PU49624	VARISTOR
⚠	VA5	PU49624	VARISTOR
	CN1	PGZ01451	CONNECTOR

****

****
* CONNECTOR BOARD ASSEMBLY <04> *
****

	PWBA	PGE30219A-02	CONN PWB ASS'Y
		-CONNECTOR BOARD1 ASSEMBLY-	
	PWBA	PGE30219A-1	CONN PWB1 ASS'Y
⚠	K1	PGZ00354	FERRITE BEADS ,X15
⚠	VA1	PU49624	VARISTOR ,X12
	CN1	PGZ01453	9P CONNECTOR
	CN2	PGZ01453	9P CONNECTOR
	CN3	PGZ01453	9P CONNECTOR
	CN4	PGZ01477-02	CABLE ASS'Y
	CN5	PU58844-8	CONNECTOR
	CN6	PU58844-6	CONNECTOR
	CN7	PU58844-10	CONNECTOR
		-CONNECTOR BOARD2 ASSEMBLY-	
	PWBA	PGE30219A-2	CONN PWB2 ASS'Y
⚠	K1	PGZ00354	FERRITE BEADS ,X9
⚠	VA1	PU49624	VARISTOR ,X8
	CN1	PGZ01455	CONNECTOR
	CN2	PU58844-10	CONNECTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
			-CONNECTOR BOARD3 ASSEMBLY-
	PWBA	PGE30219A-3	CONN PWB3 ASS'Y
	DA1	DAN601	DIODE
	DA2	DAN401	DIODE ARRAYS
	DA3	DAN401	DIODE ARRAYS
	SW1	PGZ00096-108	DIP SW
	SW2	PGZ00096-108	DIP SW
	CN1	PU58844-8	CONNECTOR
	CN2	PU58844-6	CONNECTOR
			JOG BOARD PWB ASSEMBLY <24>
	PWBA	PGE30105A-02	J.B.PWB ASS'Y
	IC1	TC4584BP	IC
	R1	QRS188J-271YN	RESISTOR
	R2	QRSA08J-122YN	RESISTOR
	R3	QRS188J-271YN	RESISTOR
	R4	QRSA08J-122YN	RESISTOR
	R5	QRS188J-271YN	RESISTOR
	R6	QRSA08J-122YN	RESISTOR
	R7	QRS188J-271YN	RESISTOR
	R8	QRSA08J-561YN	RESISTOR
	R9	QRS188J-271YN	RESISTOR
	R10	QRSA08J-561YN	RESISTOR
	C1	QER41EM-475	E CAPACITOR
	C2	QCF11HP-103	CAPACITOR
	PS1	GP2L04B	PHOTO SENSOR
	PS2	GP2L04B	PHOTO SENSOR
	PS3	GP2L04B	PHOTO SENSOR
	PS4	GP2L04B	PHOTO SENSOR
	PS5	GP2L04B	PHOTO SENSOR
	CN1	PU58844-9	CONNECTOR

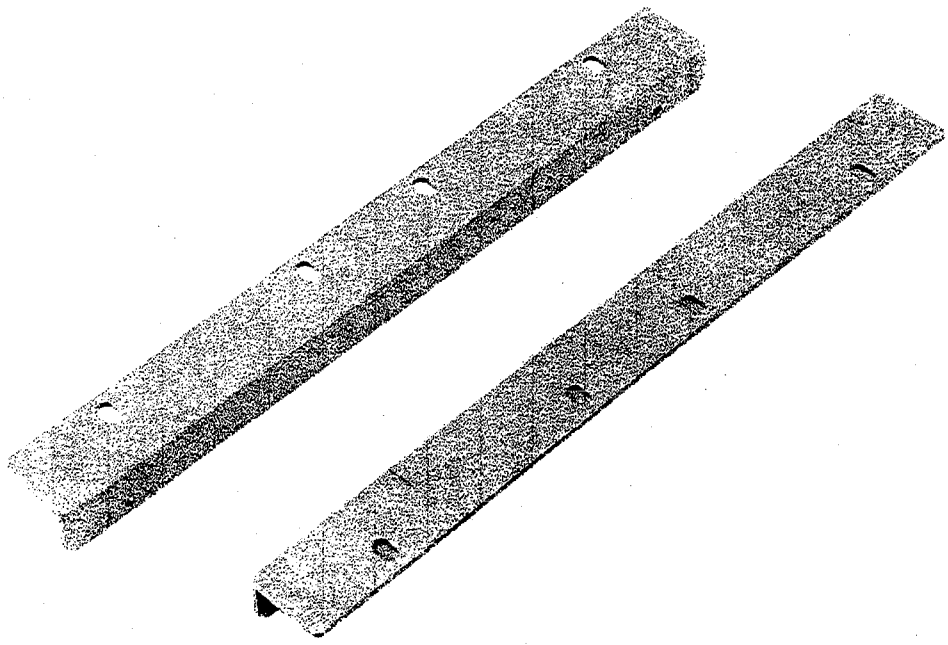
#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION

JVC

SERVICE MANUAL

RACK MOUNT ADAPTER

SA-K66U



1 . MOUNTING the SA-K66U

•The SA-K66U is a rack mounting adapter kit used to install the RM-G860U.
•Attach the rack mounting adapter to the two sides of the RM-G860U. (see Fig.1-1)

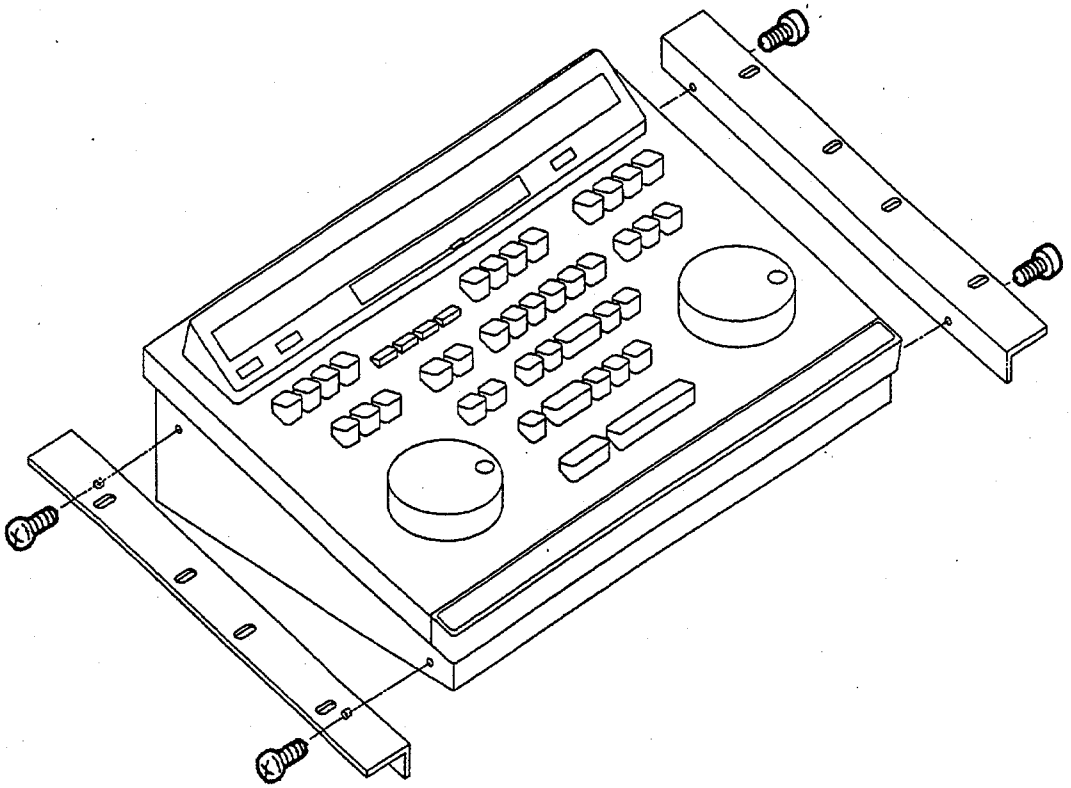


Fig. 1-1 mounting the SA-K66U

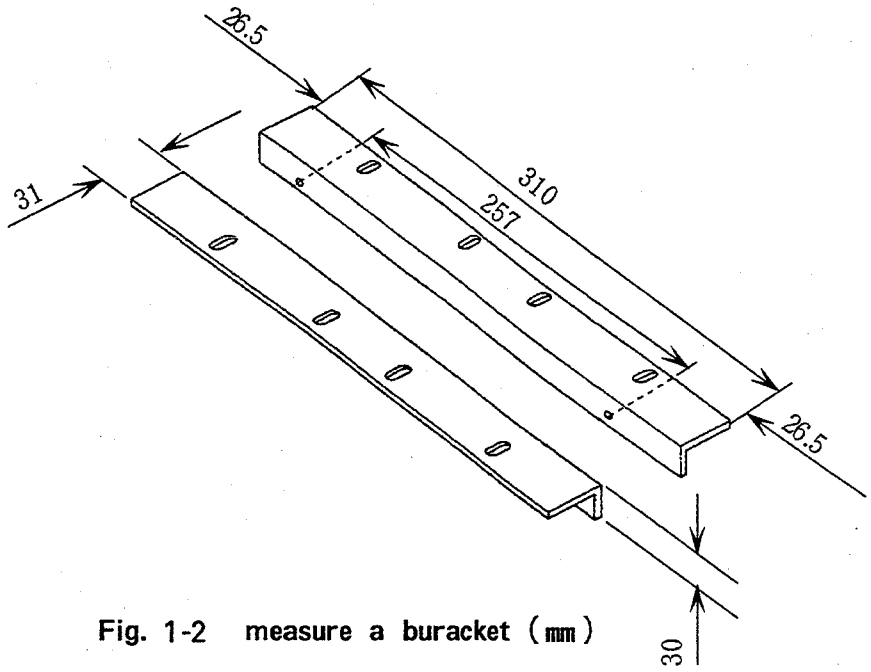
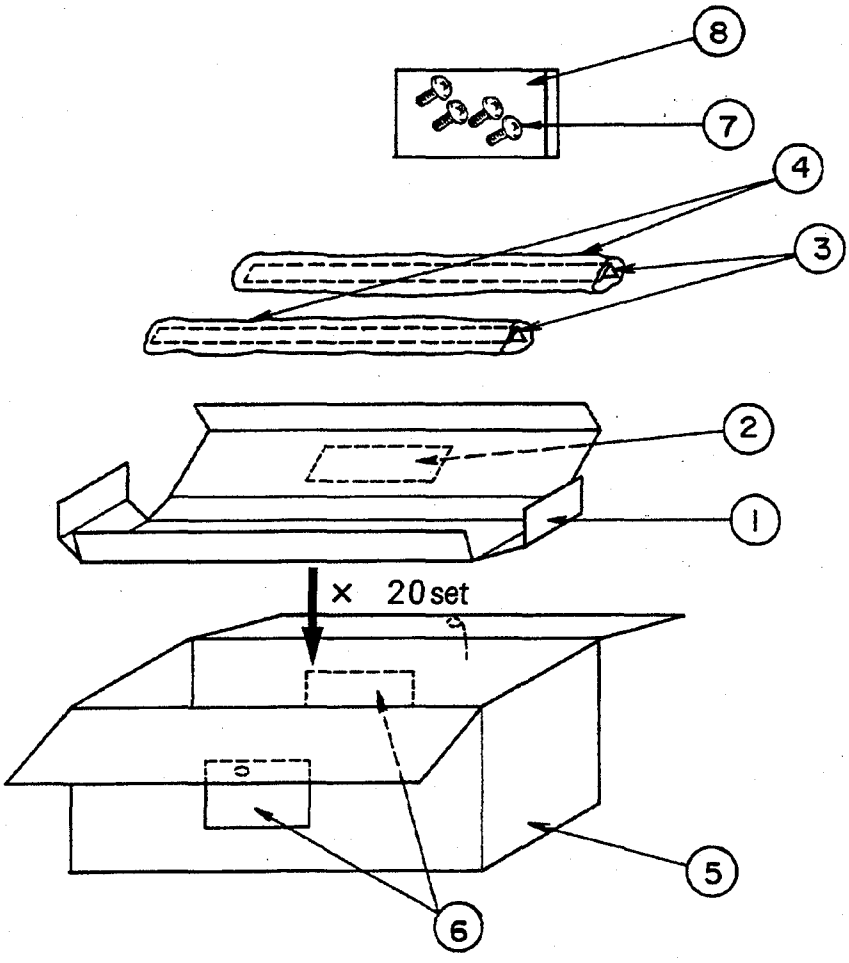


Fig. 1-2 measure a buracket (mm)

2. PACKING ASSEMBLY



Ref. No.	PART No.	PART Name	Quantity	DESCRIPTION
1	PGD30619	PACKING CASE	20	MASTER CARTON
2	PRD30412-16	PACKING LABEL	20	MASTER CARTON
3	PGD20307	SIDE BRACKET	40	
4	PRD30070-06	AIR CAP	40	
5	PRD30681-04	PACKING CASE	1	
6	PRD30394-12	PACKING LABEL	2	
7	SDBP4008R	SCREW	80	
8	QPGB005-00704	POLY BAG	20	